

Appendix B

**Draft Mine Reclamation Plan**

---



August 12, 2004

**Lloyd Burns**  
**General Manager**  
**Patterson Sand & Gravel**  
Post Office Box 12  
8705 Camp Far West Road  
Sheridan, California 95681

**Re. PATTERSON SAND & GRAVEL**  
**MINE RECLAMATION PLAN ADDENDUM**  
**Biological Mitigation and Agricultural Reclamation Areas**

Dear Mr. Burns,

Carlton Engineering, Inc. (Carlton) has prepared this Addendum to the site's Mine Reclamation Plan of June 2003 - draft version (Plan), according to your and North Fork Associates (NFA) request regarding revisions to the areas designated in the Plan for Biological Mitigation and Agricultural Reclamation. The Plan revisions are made according to the NFA June 10, 2004 "Conceptual Woodland Mitigation Plan for the Patterson Sand and Gravel Expansion" which was supplied to Carlton by NFA. Additional areas have been proposed for designation in the reclamation process as Woodland and Habitat land use areas, replacing areas previously proposed for agricultural reclamation land use. The sections of the June 2003 Plan that are amended according to the revisions, are presented here with appropriate text changes. The plan sheet showing the end land use changes (G10) has been revised accordingly and is included with this Addendum.

*Section 5.3 End Land Use*

Proposed post-mining and reclamation land uses of the mining area will consist of wildlife habitat, watershed and agricultural development. The wildlife habitat and watershed areas will consist of lakes and emergent marsh habitats (one lake previously established at the northeast portion of the site), the undisturbed oak preservation areas, Bear River Preservation Corridor; oak riparian habitat, and elderberry mitigation areas. A continuous oak riparian corridor will be created from the southwest preservation area along the north side of the Bear River up to the 29-acre oak preservation area located in the north central portion of the project. Agricultural development will occur, depending upon market needs, in the mined and backfilled areas northeast, north, and west of the proposed lake in the central area of the project on AKT property (shown on Sheet G10). Rice fields may be developed in the mined and backfilled areas southeast of the Bear River on Patterson property.

Carlton understands Patterson Sand & Gravel intends that any net loss of agricultural land considered unacceptable by the lead agency will be mitigated through offsite replacement.

**Section 6.3 Environmental Setting and Protection of Fish and Wildlife Habitat**

Wildlife habitat shall be established on land disturbed by mining operations to a condition at least as good as that which existed prior to mining operations. In order to achieve this goal, reclamation has been designed for the site to provide a varied and balanced habitat compatible with and substantially similar to that of the surrounding areas, and which existed prior to surface mining. The proposed mining areas which are not intended for backfill and redevelopment as agricultural lands will be reclaimed as *Lakes, Emergent Marsh Riparian Habitat, Oak Riparian Habitat, and Elderberry Mitigation areas*. Undisturbed *Preserve Areas* will be retained and along with the reclaimed areas, will become integrated with the existing habitat in the surrounding area providing a continuous corridor along the north side of the Bear River through the project. The following habitat mitigation measures will be implemented upon completion of mining operations in the existing and expansion areas:

- *Lakes* - 317± acres;
- Mining excavation side slopes will be planted with native oak tree species and grasses;
- *Elderberry Mitigation Area* - established in the northeast portion of the previously permitted mining area (approximately 15 acres);
- *Oak Riparian* habitat north and south of Bear River - 212± acres;
- *Emergent Marsh* - along the margins of the central and eastern lakes, (approximately 53 acres).

**Summary**

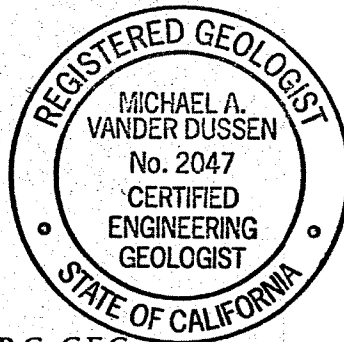
Carlton recommends this Addendum be attached to the June 2003 Plan for any distribution associated with agency approval processes.

If you have any questions regarding the information contained in this Addendum to the Draft Mine Reclamation Plan, or if we may be of further assistance, please do not hesitate to contact us.

Sincerely Yours,  
Carlton Engineering, Inc.



Michael A. Vander Dussen, R.G., C.E.G.  
Project Engineering Geologist



Robert Kull, P.E.  
Environmental Manager

cc: Cathy Spence-Wells, North Fork Associates



# SCHEMATIC

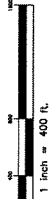
NOT FOR CONSTRUCTION

## PATTERSON SAND & GRAVEL END USE SCHEMATIC GRADING AND MINE RECLAMATION PLAN

**Project Location:**  
Patterson Sand & Gravel  
8705 Camp Far West Road  
Sherridan, California  
**Ownership Information:**  
Patterson Sand & Gravel  
P.O. Box 12  
Sherridan, California 95661

**C10**

DATE	11/17/2017
BY	J. L. L.
CHECKED BY	J. L. L.
SCALE	AS SHOWN
PROJECT	PATTERSON SAND & GRAVEL

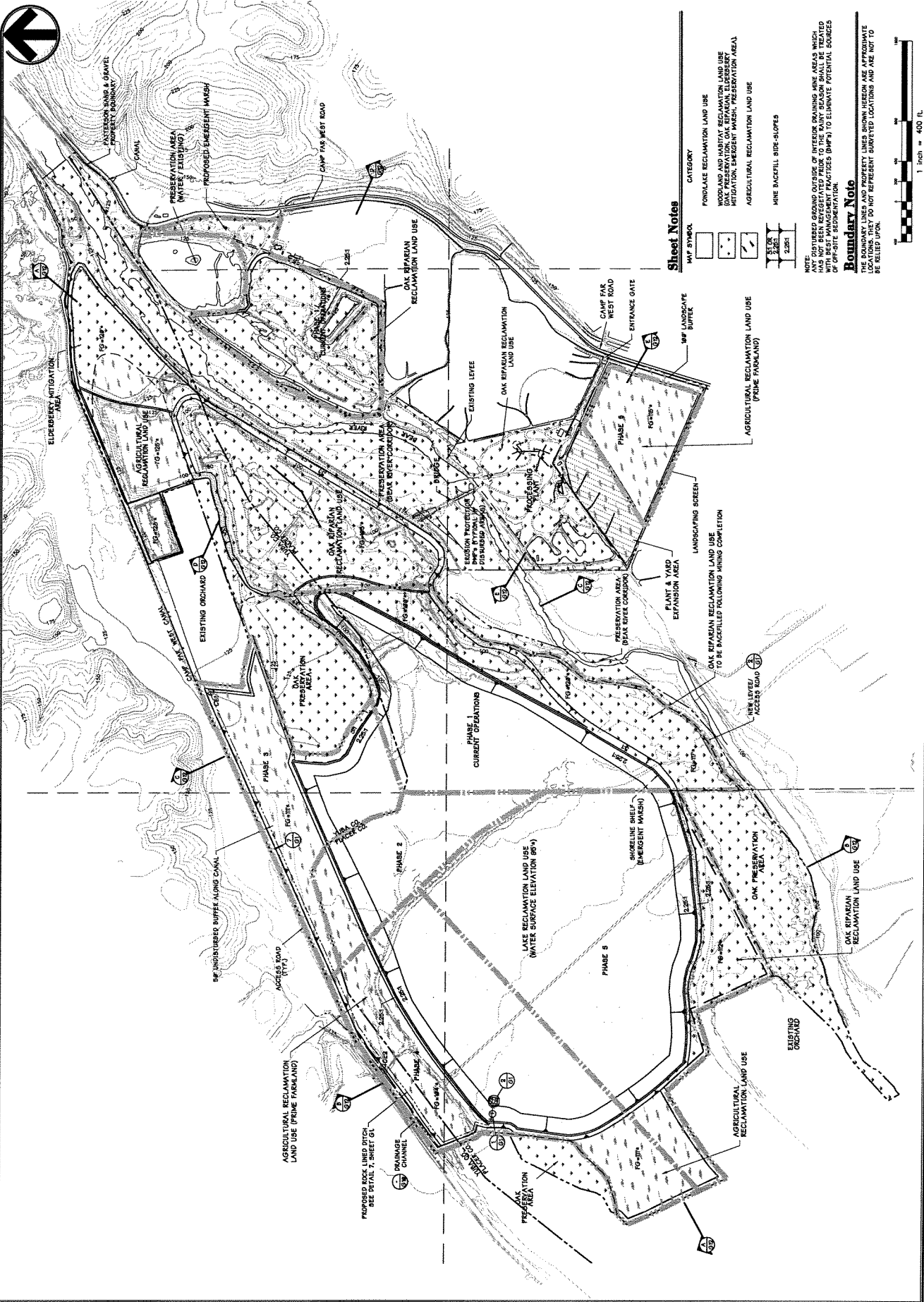


**Boundary Note**  
THE BOUNDARY LINES AND PROPERTY LINES SHOWN HEREON ARE APPROXIMATE LOCATIONS. THEY DO NOT REPRESENT SURVEYED LOCATIONS AND ARE NOT TO BE RELIED UPON.

**NOTE:**  
ANY DISTURBED GROUND OUTSIDE OF INTERIOR DRAINING MINE AREAS WHICH ARE NOT RECLAIMED SHALL BE RECLAIMED WITH BEST MANAGEMENT PRACTICES (BMPs) TO ELIMINATE POTENTIAL SOURCES OF OFF-SITE SEDIMENTATION.

### Sheet Notes

MAP SYMBOL	CATEGORY
[Symbol]	POND/LAKE RECLAMATION LAND USE
[Symbol]	WATER AND LANDSCAPE RECLAMATION LAND USE (OAK PRESERVATION, OAK RIPARIAN, ELDERBERRY MITIGATION, EXISTENT WASH, PRESERVATION AREA)
[Symbol]	AGRICULTURAL RECLAMATION LAND USE
[Symbol]	MINE BACKFILL SIDE SLOPES





# DRAFT MINE RECLAMATION PLAN

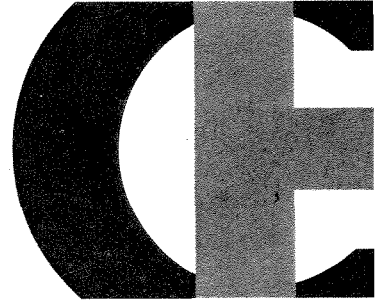
for

**PATTERSON SAND & GRAVEL**

**Camp Far West Road**

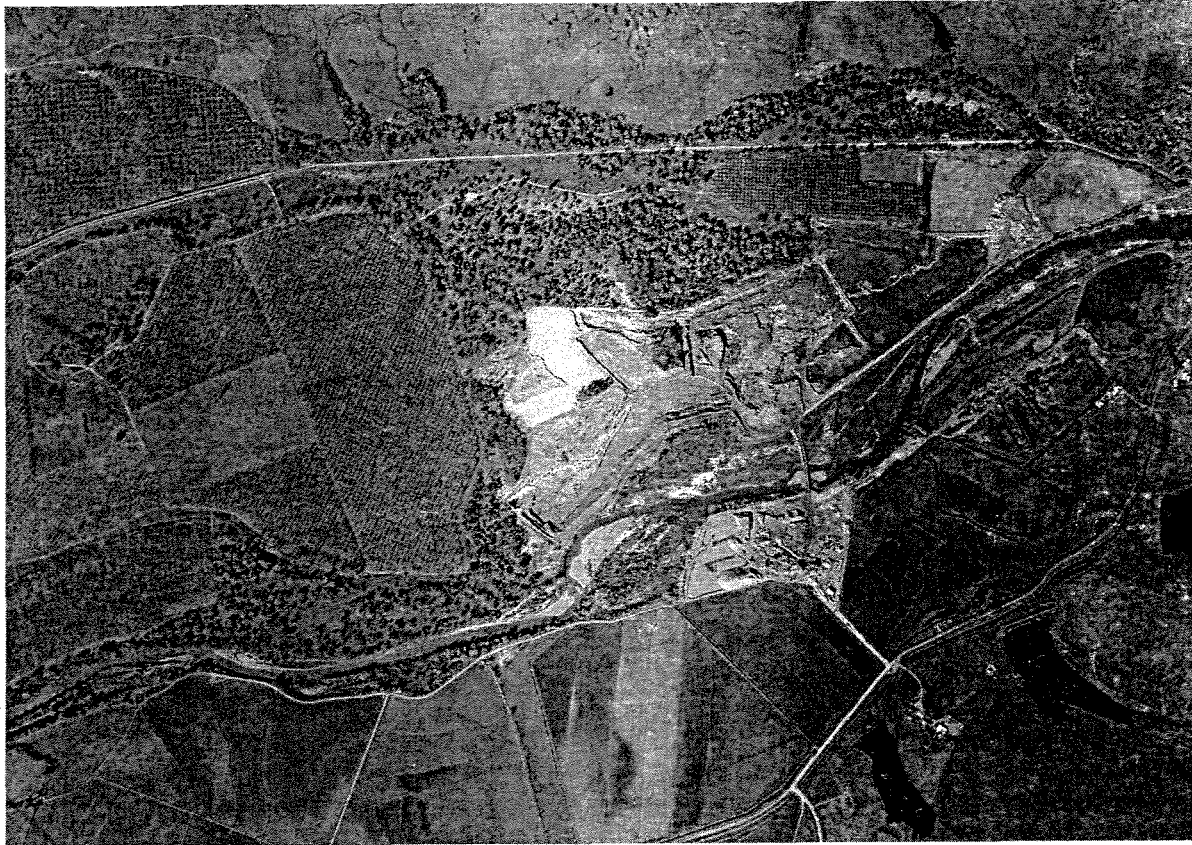
**Sheridan**

**Placer and Yuba Counties, California**



**CARLTON**

Engineering Inc.



*Prepared for:*

**Patterson Sand & Gravel**

**Post Office Box 12**

**Sheridan, California 95681**

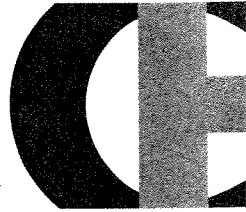
**June, 2003**

**Project No. 3186-01-98**

June 23, 2003

Lloyd Burns  
General Manager  
Patterson Sand & Gravel  
Post Office Box 12  
8705 Camp Far West Road  
Sheridan, California 95681

**CARLTON**  
Engineering Inc.



Re. **PATTERSON SAND & GRAVEL/  
DAMON ORCHARD EXPANSION AREA**  
Placer and Yuba Counties, California  
**GEOLOGICAL ENGINEERING / MINE RECLAMATION PLAN,**  
**June 2003 REVISION - D R A F T**

Dear Mr. Burns,

Carlton Engineering, Inc. is pleased to present the attached Reclamation Plan for the Patterson Sand & Gravel operations on the RMC Pacific Materials and Damon Estate properties located south and north of the Bear River in Placer and Yuba Counties, California. Carlton Engineering, Inc. has contracted with Patterson Sand & Gravel to provide these engineering services at the referenced site. The purpose of our study was to evaluate the surface and subsurface conditions in the area of the existing mining and proposed expansion areas in order to develop recommendations for project design and construction, and to develop the Reclamation Plan and Financial Assurance calculations which are presented in the following pages. This Plan reflects the modifications made to our original May, 1998 Plan during the past months due to regulatory requirements and project development decisions. Our scope of work was formed during discussions between yourself and Carlton Engineering, Inc. This Plan has been prepared exclusively for Patterson Sand & Gravel and its consultant for use in the project.

The Mining and Reclamation Plan prepared by Carlton Engineering, Inc. was discussed with you prior to developing the following recommendations for site improvements and reclamation procedures. On the basis of this study the site is suitable, from a geotechnical perspective, to receive the planned improvements provided the recommendations included in this Plan are adhered to.

If you have any questions regarding the information contained in the following document, or if we may be of further assistance, please do not hesitate to contact us.

Sincerely Yours,  
*Carlton Engineering, Inc.*

**DRAFT**

David B. Jermstad, R.G., C.E.G., R.E.A. II  
Principal, Geotechnical and Environmental  
Department Manager

Michael A. Vander Dussen, R.G., C.E.G.  
Project Engineering Geologist

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## 1.0 EXECUTIVE SUMMARY

This Reclamation Plan presents the results of the study at the Patterson Sand & Gravel mining site. The study included research, public agency contacts, field mapping and engineering analysis.

The purpose of this study was to evaluate the site conditions and to provide recommendations for site improvements, and establish reclamation conditions and procedures. This Plan is prepared in conformance with the requirements set forth in the Surface Mining and Reclamation Act of 1975 (California Public Resources Code Division 2, Chapter 9, Section 2710 et seq.), and as summarized in the California Department of Conservation, Office of Mine Reclamation document titled *Surface Mining and Reclamation Act and Associated Regulations*, dated January 1999, including 1997 statutes (hereafter referred to as SMARA).

The mine site is located on Quaternary basin and stream channel alluvium, which has been explored to maximum depths of 140 feet below the original ground surface. The mined alluvial deposits north of the Bear River are generally described as gray to white, loose, dry fine SAND (SP) with medium to coarse gravel to depths of approximately 12 to 26 feet below existing grades. Below the sand layer is a stratified combination of clayey, silty and well-graded GRAVEL (GC, GM, GW), fine sandy CLAY (CL), fine sandy SILT (SM), and clayey and silty SAND (SC, SM). The mining operations are planned for an approximate project life of 55 years. No in-stream mining is currently conducted nor is any proposed in this Plan. Current permitted mining operations are proposed to be expanded to the north and west on Damon property, and south of the existing processing plant on Patterson property. Mining will include removal of sandy soils in several areas of the Damon property, accompanied by replacement with sandy silts more suitable for agricultural development. Completed and future mining areas along the northern, western, and southern project boundary are proposed to be reclaimed by backfilling making them available for agricultural development. The central area of the mine expansion is proposed to be reclaimed as a lake with an approximate surface area of 300 acres. Final reconstructed slopes for mined areas surrounding the proposed lake above the final water surface level are recommended to be no steeper than 2.25:1 (Horizontal :Vertical) as shown on the attached design sheets, and will vary according to location and proposed end use. Reconstructed slopes bordering the eastern portion of the lake, along with interior levee slopes and existing preserve area slopes will be constructed at 3 : 1 (h:v) or flatter to promote establishment of biological habitat. Reconstructed slopes below the final water level of the lake are recommended to be no steeper than 2.25:1 (h:v).

Biological inventories of proposed mine expansion and disturbance areas indicate that site vegetation is identified as annual grassland, oak savanna, oak woodland, and non-wetland riparian woodland. Field studies have determined that the project area contains habitat for the valley elderberry longhorn beetle (VELB) and the bank swallow. Mitigations for potential loss of habitats are proposed in the reclamation practices proposed for the site, and are detailed in the *Biological Mitigation Plan* attached in Appendix B. The proposed mining discussed in this Reclamation Plan includes practices which will protect and enhance the native species and habitats where possible. The Reclamation Plan includes erosion control methods and growth media maintenance practices, along with revegetation procedures tailored to fit the specific site and its characteristics.

Financial assurances have been calculated to provide for reclamation activities according to SMARA requirements. A total of \$566,800 has been determined adequate to provide for reclamation of lands subject to current mining disturbances and those scheduled for disturbance in the next year.

## 2.0 INTRODUCTION

The Patterson Sand & Gravel mine operations and proposed expansions are located on private properties bordering the north and south sides of the Bear River approximately 2.5 miles northeast of Sheridan, in Placer County and approximately 4 miles east of Wheatland in Yuba county, California. The site has been mined since the 1940s for river gravel deposits which are processed to produce crushed sand and gravel aggregate products. The currently mined lands are owned by RMC Pacific Materials, and the S. M. Damon Estate. The proposed gravel mine expansion area is located principally on S. M. Damon Estate property, with an additional area on Patterson Sand & Gravel property south of the existing processing plant area. RMC Pacific Materials and the S. M. Damon Estate own the mineral interests of their respective properties. The mining activities are managed through Patterson Sand & Gravel. Mailing address information for the property owners is as follows:

Patterson Sand & Gravel  
Lloyd Burns, General Manager  
P.O. Box 12  
Sheridan, CA 95681

S. M. Damon Estate  
c/o W. Waggershauer  
P.O. Box 308  
Wheatland, CA 95692

This Reclamation Plan is prepared in response to requirements as set forth in the Surface Mining and Reclamation Act of 1975 (SMARA) (California Public Resources Code Division 2, Chapter 9, Section 2710 et seq.) and as summarized in California Department of Conservation, Office of Mine Reclamation Document, including 1997 statutes. Preparation of this Plan has combined review of existing information with field studies to present conclusions and/or recommendations regarding the following topics:

- The geologic setting of the site
- Potential geologic hazards
- General subsurface soil conditions
- Groundwater conditions
- Grading and earthworks
- Stockpile configuration and design
- Slope Stability
- Levee Construction
- Surface Drainage and Erosion Control
- Revegetation
- Wetlands
- Sensitive Species
- Financial Assurance

This Reclamation Plan was prepared under the responsible charge of Mr. David Jermstad, Principal, Geotechnical and Environmental Department Manager at Carlton Engineering, Inc. with Michael Vander Dussen, Project Engineering Geologist serving as project manager, and Dana Dean Project Engineer, providing technical and design sections of the Plan.

## 2.1 Current Operations

The Patterson Sand & Gravel mining operations are conducted under Placer County Conditional Use Permit CUP-1093. Aboveground storage tanks are operated and maintained in the processing area south of the Bear River under permit by Placer County.

## 3.0 SITE CONDITIONS

### 3.1 Location

The Patterson Sand & Gravel site is located north and south of the Bear River in portions of Sections 29, 30 and 31 of Township 14 North, Range 6 East, and Sections 25 and 36 of Township 14 North, Range 5 East, Mount Diablo Base and Meridian, in Placer and Yuba counties (Figure 1). Patterson Sand & Gravel properties related to the sand and gravel mining include Placer County Assessor's Parcel Numbers:

#### (RMC Pacific Materials Owned)

018-031-004  
018-031-060  
018-031-061  
018-031-062  
018-031-063  
018-140-024  
018-140-025  
018-031-005

#### (Damon Estate Lands-Leased)

018-031-050  
018-031-052  
018-031-053  
018-010-001

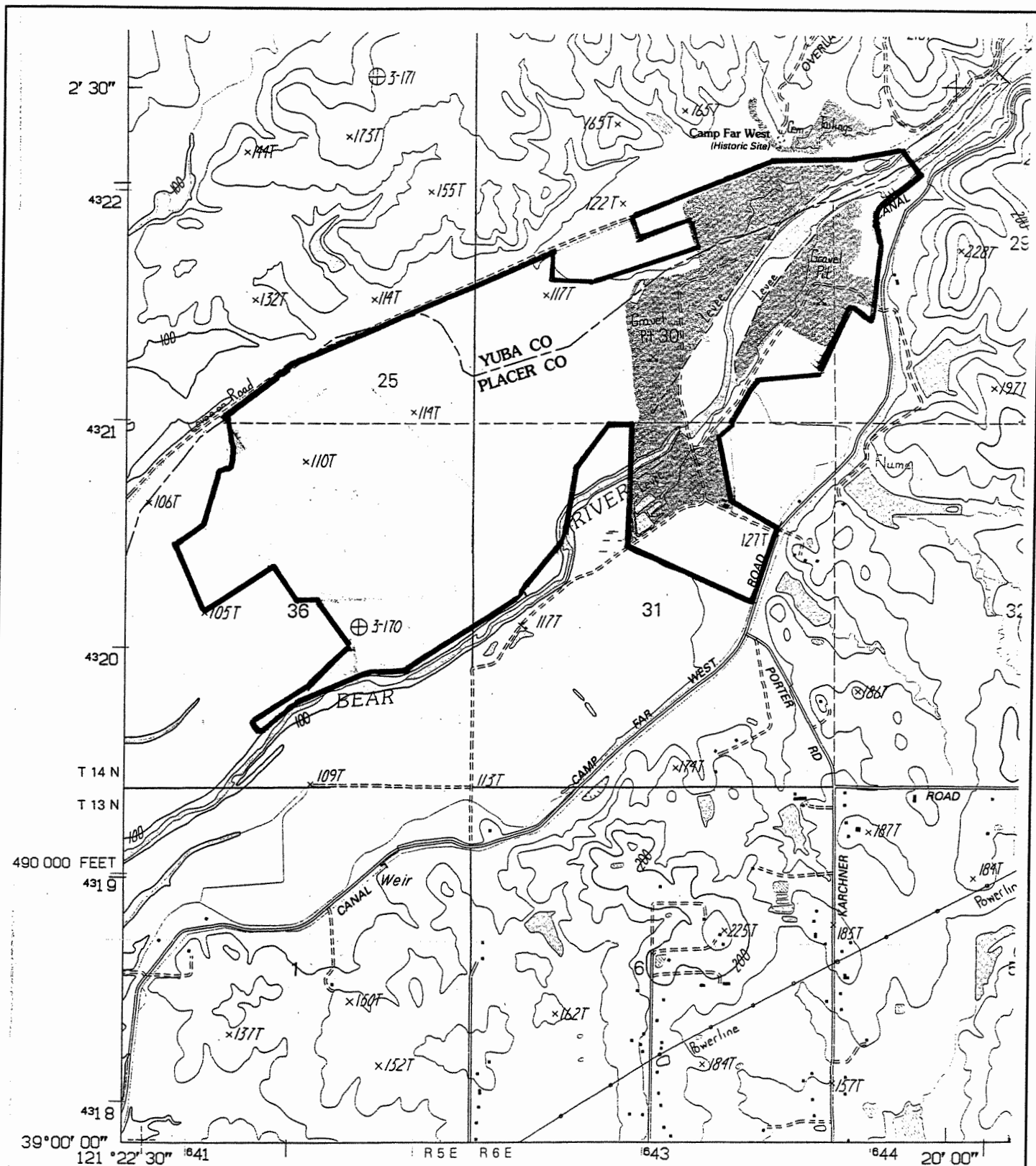
Properties related to the sand and gravel mining in Yuba County include Assessor's Parcel Number:

#### (Damon Estate Lands-Leased)

15-370-002

Access routes and the location of the mining operations are indicated on Sheets G1 and G2 in Appendix A.





**LOCATION MAP**  
Camp Far West, CA USGS 7.5 min. series  
1:24,000

**PROJECT 98-061**

**August 2000**



**Carlton Engineering, Inc.**  
3932 Ponderosa Road, Suite 200  
Shingle Springs, California 95682

Patterson Sand & Gravel  
Camp Far West Road, Sheridan  
Mine Reclamation Plan

*Placer & Yuba Counties, California*

**FIGURE**  
**1**

### 3.2 General Site Description

The Patterson Sand & Gravel operation is a developed sand and gravel mine with a total existing and expanded project area of approximately 884 acres, north of Camp Far West Road. This area includes permitted and expansion mining and processing areas, preserve areas, and the Bear River channel which extends through the project. Supporting office and maintenance facilities are located south of the Bear River, with the majority of the currently developed aggregate deposits located north of the present river channel. Completed mining areas south of the Bear River are reclaimed as riparian areas with ponds and native riparian vegetation in accordance with the existing site Reclamation Plan dated December 18, 1986. Access from the processing plant facilities on the south side of the river, to the active mining areas north of the river is provided by a steel and concrete pier bridge. Levees exist along the north bank of the river from the eastern site limits to approximately 1,600 feet downstream of the bridge crossing, and on the south side of the river from the eastern site limits to approximately 1,000 feet upstream of the bridge. Oak woodland and walnut orchards border the currently permitted project site on the north and west, and rice field land borders the site on the south. A farm road and concrete-lined irrigation canal lie along the majority of the northern project boundary. Existing site conditions are indicated on Sheet G2. Site photographs showing typical mining conditions and revegetated areas, and the photograph index are included on Figures 2, 3, 4, and 5.

The proposed mining expansion areas are located north of the Bear River, and south of the existing processing plant in the historic flood plain of the Bear River. The areas of expansion are projected to occupy approximately 315 acres within Placer County and approximately 50 acres within Yuba County (total 365 acres of expansion). This is in addition to the currently permitted mining area of 326 acres and does not include the 110 acre Bear River Preservation Corridor or 83 acres of Oak Woodland Preserves being proposed. The expansion areas are presently covered with oak savanna, oak woodland, riparian woodland, and walnut orchards.



**C**  
**CARLTON**  
Engineering Inc.  
1932 Ponderosa Road, Suite 100, CA 95822  
Phone: 916-481-1111 Fax: 916-481-1112

**SCHEMATIC**  
NOT FOR CONSTRUCTION

Revisions	DATE	BY

**PATTERSON SAND & GRAVEL**  
**PHOTO LOCATION MAP**

**Project Location:**  
Patterson Sand & Gravel  
8705 Camp Far West Road  
Sheridan, California

**Ownership Information:**  
Automatic Aggregate Systems  
P.O. Box 12  
Sheridan, California 95681

DESIGNED	MVD	DATE	8/10/2000
DRAWN	ML	PROJ. SCALE	N/A
JOB NO.	98-06	PLAN. SCALE	N/A
SHEET	080700-1250		

**FIG2**



Photo 1 - View of Active Mining Area, Phase 1

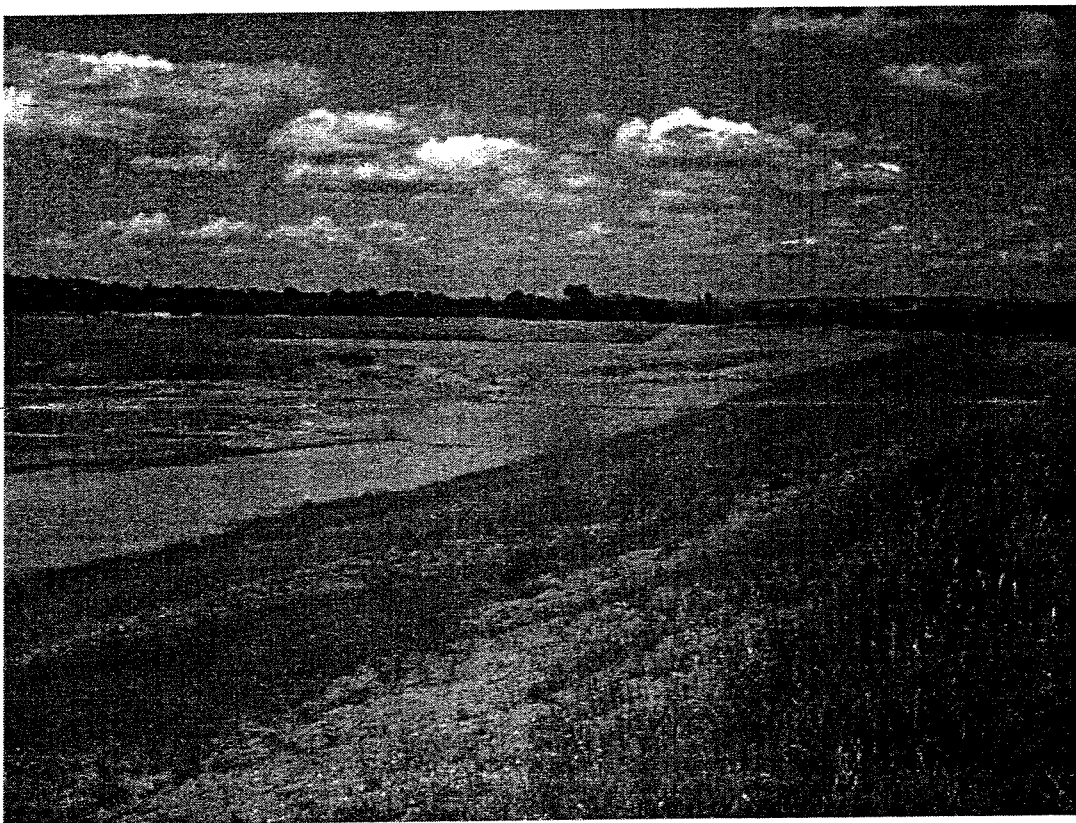


Photo 2 - View Looking Northeast, Re-Contoured 3:1 Slope

PROJECT 98-061

August 2000

Patterson Sand & Gravel  
Camp Far West Road, Sheridan  
Mine Reclamation Plan

*Placer & Yuba Counties, California*



**Carlton Engineering, Inc.**  
3932 Ponderosa Road, Suite 200  
Shingle Springs, California 95682

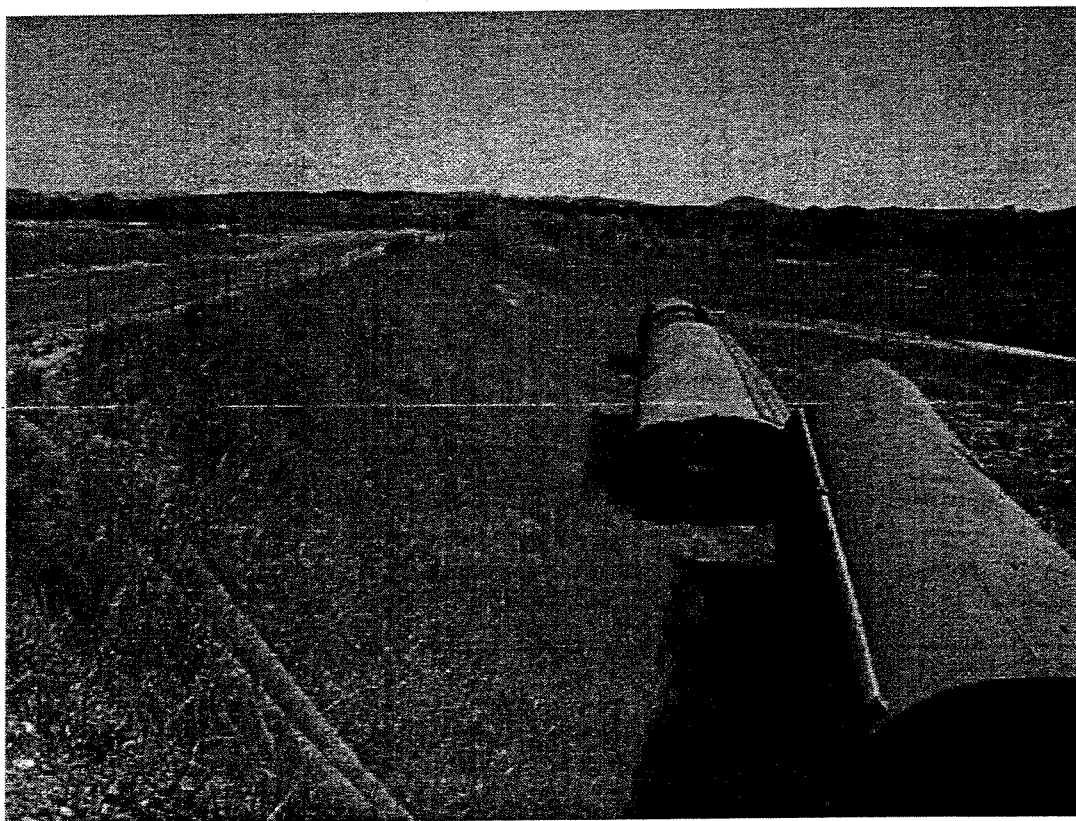
FIGURE

3





**Photo 3 - View Looking East Across Permitted Mining Area**



**Photo 4 - View Looking NE Along River Side of Levee (SE Bank, NE of Bridge)**

**PROJECT 98-061**

**August 2000**

**Patterson Sand & Gravel  
Camp Far West Road, Sheridan  
Mine Reclamation Plan**

*Placer & Yuba Counties, California*



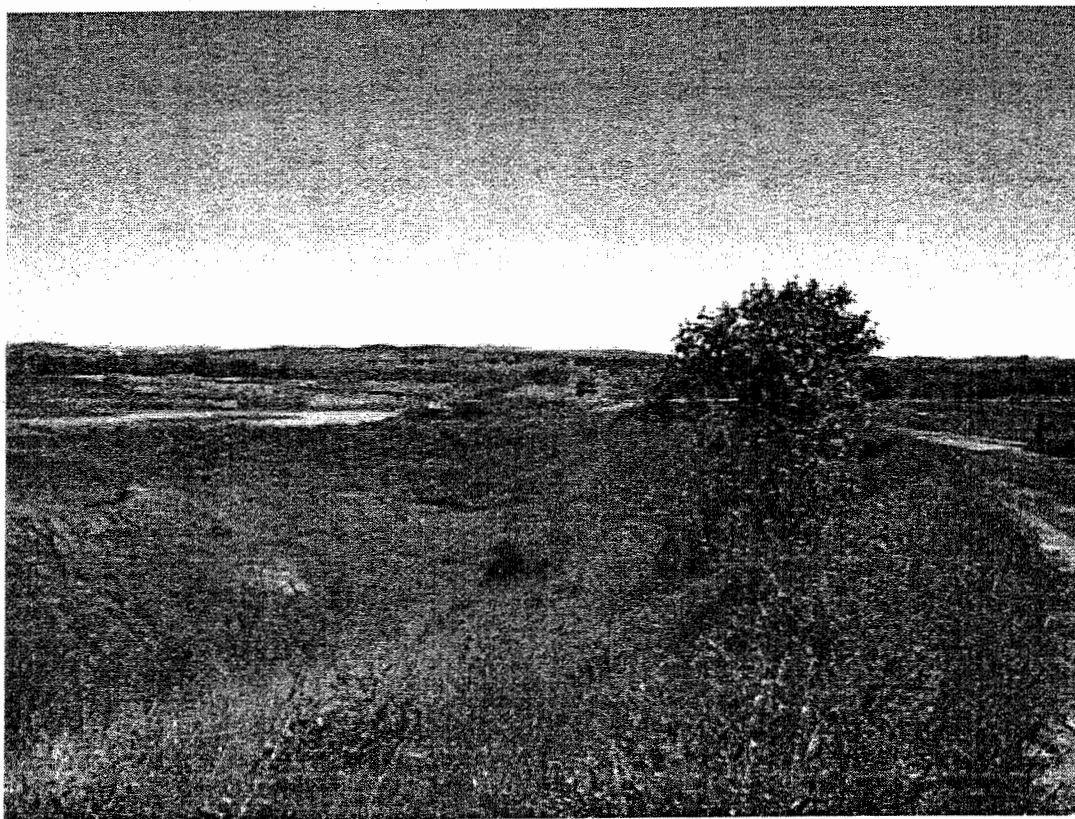
**Carlton Engineering, Inc.**  
3932 Ponderosa Road, Suite 200  
Shingle Springs, California 95682

**FIGURE**

**4**



**Photo 5 - View Looking SE, Bridge Crossing the Bear River**



**Photo 6 - View Looking NE Across Permitted Mining Area, NW Bank of Levee**

**PROJECT 98-061**

**August 2000**

**Patterson Sand & Gravel  
Camp Far West Road, Sheridan  
Mine Reclamation Plan**

*Placer & Yuba Counties, California*



**Carlton Engineering, Inc.**  
3932 Ponderosa Road, Suite 200  
Shingle Springs, California 95682

**FIGURE  
5**

### 3.3 Topography

Original ground surface elevations of the project site range from approximately 100 feet to 140 feet above mean sea level (msl). Topography outside of the current mining areas and the river channel is relatively flat with gently rolling foothills north, east and south of the Bear River flood plain in the project area. The river channel is bordered by natural and constructed levees through the current permitted mining area. Mine excavations north of the river (northeast of the bridge) have created a main area basin with floor elevations ranging from 75 to 90 feet msl. Topography within the mine site south of the river is characterized by low mounds of reserve materials, and one existing pond. Expansion areas south of the river are flat and developed as rice fields. Elevations stated and referenced in this Plan are based on aerial survey topography prepared by Towill, Inc. of Concord, California, in March 1999.

### 3.4 Geology

#### 3.4.1 Regional Geology

The Patterson Sand & Gravel mining operations are located near the boundary between the Great Valley and Sierra Nevada Geomorphic Provinces along the north and south sides of the Bear River (32 miles north-northeast of the City of Sacramento and 15 miles southeast of the City of Marysville). These provinces lie east of the Coast Range province and west of the Basin Ranges province and trend in a northwest direction for approximately 400 miles from the Mojave Desert in the south to the Cascade Range and Modoc Plateau on the north.

The western margin of the west-sloping Sierra Nevada block is characterized as a foothill belt of Jurassic period plutonic and metamorphic volcanic rocks with northwest trending structures and fault zones. Cenozoic era deposits along the eastern margin of the Sacramento valley overlie the westward sloping metamorphic and plutonic bedrock surface. The sedimentary deposits range from undifferentiated basin and stream channel deposits to highly dissected alluvial terraces of semi-consolidated gravel sand and silt.

#### 3.4.2 Mine Area Geology

The mine site is located immediately west of the area where the Bear River makes its transition from foothill canyon channel flow to a wider flood plain with a valley stream gradient. The geologic unit exposed on the site is mapped as undifferentiated Quaternary basin and stream channel alluvium consisting of unweathered and unconsolidated silt, sand, and gravel (Loyd, 1995). The Sierra and foothill sources of the alluvium deposited in the gravel mine area include: 1) older alluvial deposits contained in Tertiary period river gravels which through uplift of the Sierran block have been eroded by down-cutting of the modern river and stream courses; 2) Tertiary period volcanic mudflow and pyroclastic deposits; and 3) metamorphic and plutonic bedrock units of the Sierra. Alluvial deposits in the project area have typically been sorted by particle size through water transport, and the majority of the unstable components and fines have been removed and deposited farther west in the valley. Many of the source rock units were composed of high concentrations of quartz gravels or siliceous bedrock, and the resulting sediments are consequently high in quartz sands and gravels.

#### 3.4.3 Alluvium Characteristics

The Bear River alluvial deposits are exposed in the existing excavation banks and basins and

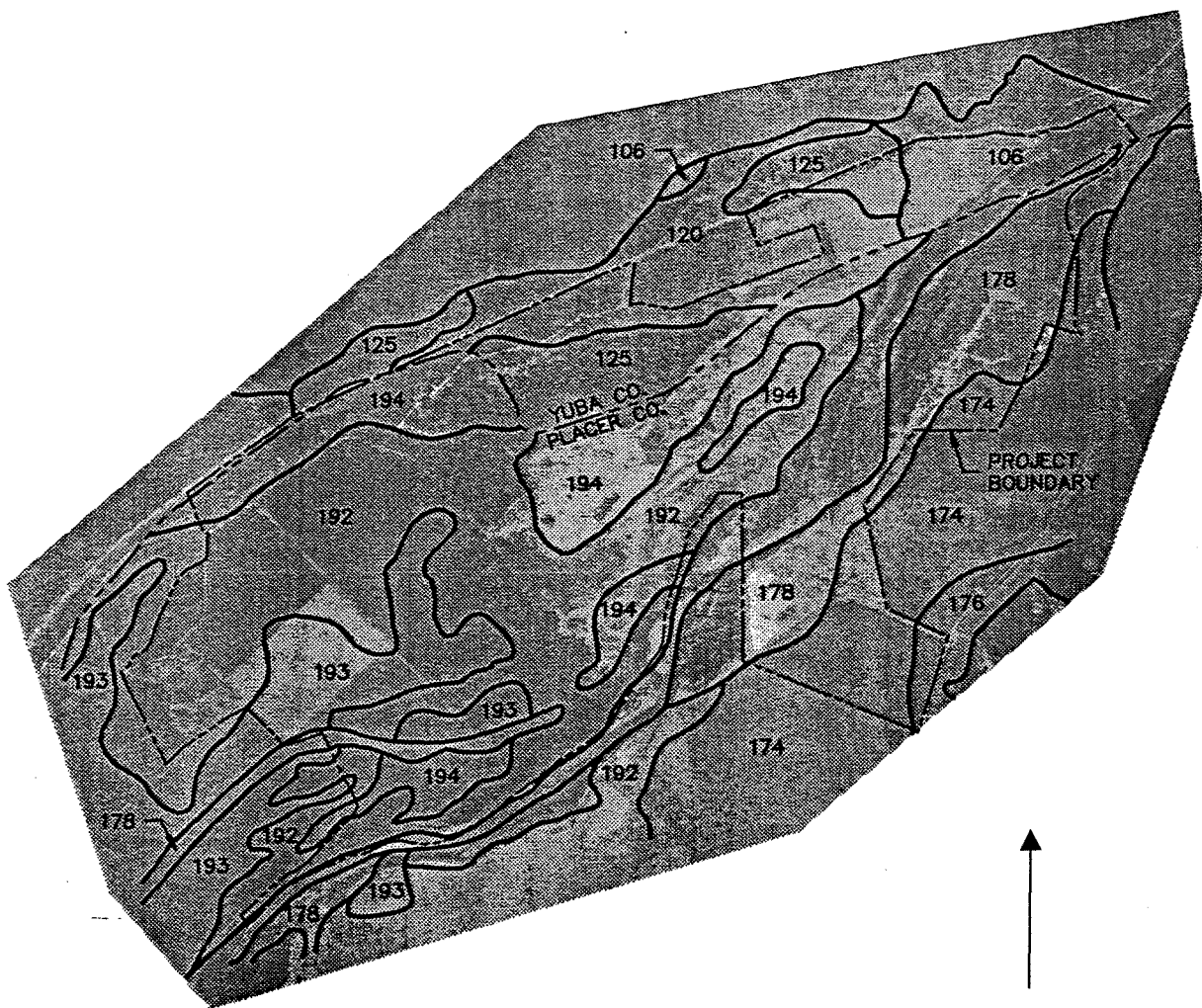
have been sampled in exploration borings conducted in the proposed mining areas north and south, of the Bear River. The deposits explored to maximum depths of 140 feet below the pre-mining surface consist of silty fine SAND, sandy fine to coarse GRAVEL, sandy clayey GRAVEL, sandy gravelly CLAY, and clayey sandy fine to coarse GRAVEL with cobbles.

The California Department of Conservation, Division of Mines and Geology (DMG) has classified lands of Placer County according to known or inferred mineral potential in accordance with SMARA. The existing and expansion mine sites are located within Mineral Resource Zones 2a, 2b, and 3a, and Aggregate Resource Areas 1 and 7 as defined and identified in DMG Open File Report 95-10 (Lloyd, 1995). These classifications indicate that the site property is recognized by the State of California as being a locally significant (immediately significant and highly significant) construction aggregate resource and that local planning agencies are to consider mineral extraction when determining compatible land use regulations.

### 3.5 Soil Development

Mapping and classification of the predominant near surface soils in the proposed site expansion area has been conducted by the U.S. Department of Agriculture, Soil Conservation Service (SCS, more recently identified as the Natural Resources Conservation Service/District, NRCS and local districts, NRCD). Soil units mapped at the site and described in the Soil Survey of Placer County, California, include three classifications of the *Xerofluvents* soil type, and the *Ramona* and *Riverwash* map units. Soil units mapped at the site and described in the Soil Survey of Yuba County, California, include *Columbia fine sandy loam*, *Holillipah loamy sand*, and *Dumps -mine tailings* units. The soil unit boundaries are shown as an overly on the Project area aerial photograph on Figure 6.





#### Soil Mapping Units

- 106: Dumps, mine tailings
- 120: Columbia fine sandy loam
- 125: Holillipah loamy sand
- 174: Ramona sandy loam
- 178: Riverwash
- 192: Xerofluvents, sandy
- 193: Xerofluvents, occasionally flooded
- 194: Xerofluvents, frequently flooded

**Soil Units in the Project Area**  
as defined by the USDA Placer and Yuba County Soil Surveys

**PROJECT 98-061**

**August 2000**



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Patterson Sand & Gravel  
Camp Far West Road, Sheridan  
Mine Reclamation Plan

*Placer & Yuba Counties, California*

**FIGURE**  
**6**

### 3.5.1 Placer County Soil Mapping Units

The three classifications of the *Xerofluvents* soils mapped in the permitted and expansion areas on the project site are the *Xerofluvents, sandy*, the *Xerofluvents, occasionally flooded*, and the *Xerofluvents, frequently flooded*. The *Riverwash* soil unit is located adjacent to the channel of the Bear River in the area of permitted mining operations. The *Ramona* soil unit occupies a small area southeast of the Bear River in the southern and eastern portion of the Patterson property.

The *Xerofluvents, sandy* soil unit is comprised of small areas of moderately well drained, stratified sandy alluvium adjacent to the Bear River. It is derived from mixed sources, consisting of stratified loamy sand and silt loam to sand, with gravel in places. The subsoil consists of thin lenses of silts and loams. The site is characterized with an annual precipitation of approximately 18 to 22 inches and the average number of days in the growing season (frost-free period) is 280 days.

The *Xerofluvents, sandy* soil unit is described as being moderately deep, and subject to occasional flooding by stream overflow. The regional water table rises to variable near-surface levels in the winter months and drops to approximately 60 inches below the ground surface in the late spring. Surface runoff is slow, with the permeability classified as being moderately rapid or rapid, and the available water capacity is approximately 3 to 5 inches. Effective rooting depth is 60 inches or more and the maximum erosion hazard is slight. The soil is described as being a variable, non-plastic stratified sand and loamy sand (SP-SM) from the surface to approximately 60 inches below the surface. The fraction of a typical sample passing the no. 200 sieve is from 5% to 30%. The soil pH ranges from 6.1 to 7.8.

The *Xerofluvents, occasionally flooded* soil unit is characterized as small areas of moderately well drained, loamy alluvium adjacent to the Bear River stream channels. It consists of stratified sandy loams, loams, clay and silt loams that generally become gravelly with increasing depth. This soil unit is subject to occasional flooding from stream overflow. Surface runoff is slow, with the permeability classified as being moderate to moderately slow, and the available water capacity is approximately 8 to 10 inches. Effective rooting depth is greater than 60 inches and the maximum erosion hazard is slight.

The *Xerofluvents, frequently flooded* soil unit is comprised of narrow areas of somewhat poorly drained, recent alluvium adjacent to the Bear River stream channels. It consists of stratified gravelly sandy loams, gravelly loams, and gravelly clay loams that generally grade to sands and gravel with increasing depth. This soil unit is subject to frequent flooding and channelization by stream overflow. Surface runoff is slow, with the permeability classified as being variable and the available water capacity approximately 2.5 to 6 inches. Effective rooting depth is greater than 36 inches and the maximum erosion hazard is high.

The *Riverwash* unit is identified as being located in and along the Bear River channel and is characterized as a highly stratified stony and bouldery sand that is typically barren and includes areas of tailings. The permeability is very rapid and surface runoff is rapid. The hazard of erosion in this unit is classified as being very high.

The *Ramona sandy loam, 0 to 2% slopes* soil unit is mapped along the southern boundary of the project site in the area of the processing plants and stockpiles, and in proposed mining Phase 6. This unit is described as being very deep and well drained, and is located on alluvial bottoms and low

terraces. The typical profile for the unit includes sandy loam (SM) from 0 to 6 inches below the surface, loam (ML, CL-ML) from 6 to 14 inches below the surface, sandy clay loam, and sandy loam and loam (SC, SM-SC) from 14 to 55 inches below the surface, and gravelly sandy loam, and gravelly coarse sandy loam (SM, SM-SC) from 55 to 73 inches below the surface. Permeability is moderately slow, the available water capacity is 6.5 to 9.5 inches, surface runoff is slow and the hazard of erosion is slight.

### 3.5.2 Yuba County Soil Mapping Units

Soils in the area of the historic and current mining activities in Yuba county have been classified as the *Dumps, mine tailings* unit and the *Columbia fine sandy loam* unit, which are located north of the present day channel of the Bear River. One additional soil unit in the area of the permitted and expansion areas is mapped as *Holillipah loamy sand*.

The *Columbia fine sandy loam, 0 to 1% slopes* is a very deep and somewhat poorly drained soil located in flood plains. The typical profile for the unit includes fine sandy loam (SM, SM-SC) from 0 to 9 inches below the surface, fine sandy loam and sandy loam (SM, SM-SC) from 9 to 18 inches below the surface, and stratified sand to silt loam (SM) from 18 to 60 inches below the surface. Permeability is moderately rapid, the available water capacity is 4 to 7 inches, surface runoff is slow and the hazard of erosion is slight.

The *Holillipah loamy sand, 0 to 1% slopes* is also very deep and is somewhat excessively drained, and located in flood plains. The typical profile for the unit includes loamy sand (SM) from 0 to 6 inches below the surface, and stratified silt loam to sand (SM) from 6 to 66 inches below the surface. Permeability is moderately rapid, the available water capacity is 4 to 5 inches, surface runoff is slow and the hazard of erosion is slight.

The *Dumps, mine tailings* unit is identified as being composed of materials dredged from river channels and flood plains during gold mining operations, which has been left mounded in long narrow tailings piles ranging in height from 5 feet to 40 feet. This unit is identified as a source for sand and gravel construction materials.

### 3.6 Slope Stability

Evidence of historical or active slope failure in natural slopes has not been observed on the project property during mapping for the preparation of this Plan. Constructed 2:1 (h:v) slopes on the north bank of the levee in the area north of the bridge were observed to have experienced shallow earthflow type failure within limited areas during the rainy months of the 1997 - 1998 winter season. These slopes have subsequently been re-worked to a 3:1 slope angle.

The general integrity of existing and proposed cut and fill slopes will be maintained by limiting the final slopes to a maximum of 2.25:1 (h:v), unless additional supporting technical recommendations are issued indicating otherwise. This Plan specifies all final mine slopes of constructed fills to be at a maximum slope of 2.25:1 (h:v) in order to provide an appropriate factor of safety. Preliminary geotechnical requirements for the site are specified further in this report in section 5.4 - Geotechnical Requirements.

### 3.7 Seismic considerations

The historical pattern of seismic activity in Placer and Yuba Counties west of the Sierra crest has generally been characterized as a very broad scattering of small magnitude earthquakes. Portions of the Sierra Nevada geomorphic province approximately 20 to 30 miles (32 to 48 km) east of the project vicinity are characterized by a high rate of seismicity, where many moderate to large earthquakes are historically recorded to have occurred.

A review of the Seismicity of California Map (Goter and others, 1994) within 100 kilometers (60 miles) of the site reveals numerous earthquake epicenters. These epicenters are generally located on the eastern flank of the Sierra Nevada and the eastern flank of the Diablo Range with scattered epicenters located throughout the Sierra foothills. According to the Fault Activity Map of California and Adjacent Areas (Jennings, 1994), the nearest known active fault to the site is the Cleveland Hill fault located approximately 27 miles (44 km) to the north. Other potential sources of seismic shaking are located: 1) nearby in the Foothills Fault System to the east including the Dewitt, Spenceville, Deadman, Swain Ravine and Wolf Creek faults located as near as approximately 2 miles east of the site; 2) in the Sacramento Valley to the west including the Dunnigan Hills fault (33 miles west of the site); and 3) the more distant Coast Range Sierra Block Boundary fault zone. The Foothills fault system is well defined, but has been determined to be relatively inactive due to a lack of Holocene surface displacement.

Historic data recording earthquakes along faults north, east and southeast of the site in the Sierra Foothills suggest that portions of the Foothills Fault system are seismically active (Clark, 1960). The Foothills fault system is understood to have a very low slip rate ( $<0.005$  mm/year) and long recurrence interval on the order of 30,000 to 100,000 years (Woodward Clyde, 1977).

#### 3.7.1 Onsite Faulting & Seismic Design

The U.S. Geological Survey, *National Seismic Hazard Mapping Project* indicates that the horizontal peak ground acceleration (PGA) in the site area is estimated to be 0.14g for Rock sites. This estimate presumes a 5% probability of exceedence in 50 years, or an approximate return period of approximately 949 years for events producing this magnitude of acceleration at this Site. The study Site is shown to be within Seismic Zone 3 by Figure 16-2 of the 1998 CBC, which correlates to a site Seismic Zone Factor,  $Z$ , of 3. Structural features designed for this Site should utilize a CBC Soil Profile Type of  $S_D$ .

#### 3.7.2 Liquefaction Potential

Due to the seismicity in California, the opportunity for earthquake-induced liquefaction or landsliding is present throughout the state. However, based on the native soil properties of the site, the susceptibility and danger from earthquake-induced liquefaction is localized to those areas underlain by thick sections of loose poorly graded saturated sand. Field studies indicate that undisturbed areas of the Damon Estate properties are characterized by a top section of up to 25 feet of loose, dry to moist, slightly silty, fine SAND with coarse gravel (SP). In a saturated condition these soils are considered to have a potential for liquefaction. Observed groundwater levels are between 20 and 40 feet below ground surface in the undisturbed proposed mining area containing the poorly graded SAND. The seismicity of the site is relatively low and according to proposed project development plans no structures are planned for the proposed mined area. Project plans include provisions for a future asphalt plant in the area of existing settling ponds near the western side of the present processing plant

facilities. A foundation study will be completed in the area of proposed structural improvements prior to the time construction permitting of an asphalt plant is initiated in the area of the settling ponds. Foundation studies will also be completed in other mined areas of the site where structural improvements may be proposed.

### 3.7.3 Seismic Settlement

Localized soil slumps could be induced with increased pore pressures or loss of shear strength due to shaking, however the susceptibility is low. Other loose material such as stockpiles or unconsolidated alluvium will be susceptible to seismic settlement. These materials will not be used for structure foundations and any fills supporting equipment or processing facilities will be placed according to the engineered fill specifications included in this Plan.

### 3.8 Tsunamis, Seiches, & Volcanic Eruptions

The site is located at the western margin of the central Sierra Nevada province of California and not susceptible to impacts from tsunamis or volcanic eruptions.

Minor seiche impacts could be locally significant within the area of the settling ponds. The impacts may result in localized wave erosion and/or charging drainage channels with a higher transient flow. The potential for wave erosion damage can be addressed either by slope protection or by anticipated repair of erosion damage following such an event.

### 3.9 Flooding

The Bear River flows are restricted by the Camp Far West Dam and the Camp Far West Reservoir approximately 3 miles east-northeast of the site. The spillway at the Camp Far West Dam is uncontrolled with an overflow at an elevation of approximately 300 feet above msl. The South Sutter Irrigation District operates an electric power generation station at the dam and according to Brad Arnold, General Manager at the Water District, the flow of water through the powerhouse can be controlled and has a maximum flow of approximately 650 cubic feet per second (cfs). Mr. Arnold reports that flows over the dam during the February 1996 flood were approximately 32,000 cfs during the approximately 3-hour peak.

The Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Map (FIRM) for the site shows that the entire project site including the expansion areas, is located within Zone A which is identified as the 100-year flood area. In the event of a 100-year flood event occurring at the site, significant impact to mining operations is not anticipated other than a temporary stoppage of mining operations due to standing water on the site. Operations would be expected to resume as soon as water levels recede in response to a drop in the Bear River water level and the local groundwater table and according pumping to adjacent agricultural areas.

This Plan includes the construction of a levee as an extension of the existing levee on the north side of the Bear River within the permitted mining area. The levee extension is planned to begin at the western terminus of the existing levee on the north side of the river, located downstream of the bridge which provides access to the mining areas north of the river. The levee will terminate near the southwestern corner of mining Phase 1. The new levee will be constructed with top elevations of approximately 121 feet msl in the east and approximately 115 feet msl in the west.

Based on historic flood data from Patterson Sand & Gravel and South Sutter Irrigation District as reported by Western Planning and Research in their July, 1997 report for the project site, the Bear River water levels in the vicinity of the mine during February, 1986 storm events were estimated to be approximately 111 feet msl in the east and approximately 107 feet msl in the west. Water surface profile modeling for the river (Murray Burns and Kienlen, 1999) has not been available up to the time of preparation of this Plan. Additional 100-year flood elevation information will be evaluated as it becomes available and appropriate design revisions will be made as necessary.

#### 4.0 WILDLIFE HABITAT AND VEGETATION STUDY

A *Biological Resources Report* was prepared February 12, 1996 by Jeff Glazner, Biologist and Wetlands Specialist for a 162 acre portion of the Damon Estate where mining expansion is proposed. Additional studies were conducted by North Fork Associates as reported in the *Biological Resources Assessment for the Patterson Sand and Gravel/Damon Orchard Expansion Area, Dated November, 2000* which covered a total of approximately 195 acres of proposed mining and preserve areas outside the developed orchards, in proposed mining phase areas 1 through 5. A copy of the November 2000 report is included in Appendix B.

##### 4.1 Wildlife Habitats and Vegetation

Natural wildlife habitats for the entire project site have been classified from aerial photography, topographic maps, and field mapping. Four major habitat types were delineated and identified as annual grassland, oak savanna, oak woodland, and riparian woodland. The annual grassland is comprised predominantly of species of non-native grass and non-native, non-grass species, with sparse woody vegetation. Oak savanna is primarily grassland interspersed with scattered individual oak trees or small clusters of oak trees. It is a type of habitat intermediate between grassland and oak woodland. The oak woodland habitat is the most abundant habitat on the site. It is dominated by native oak species (primarily Valley oak) and supports some species of shrubs. The riparian woodland supports trees and shrubs adapted to moist soil conditions where the groundwater table is near the surface for extended periods. A discussion of Special Status Species plants and birds, and habitats for Special Status Species invertebrates and birds, is included in the *Biological Resources Assessment*. As noted in the assessment, a total of 13 special status species were judged to have a potential to grow, nest, or otherwise occupy the site for all or at least part of their life cycle.

The only special status plant species with potential to occur on the project site is the big-scale balsamroot. This species was not observed during the North Fork surveys of the project site.

Over four hundred elderberry shrubs were mapped in the study area. Two hundred twenty five of these shrubs exist in two of the proposed oak preserve areas. Shrub stems greater than one inch in diameter are considered potential habitat for the federally listed threatened valley elderberry longhorn beetle.

One bank swallow colony of approximately 25 nesting pairs was observed along the eroding bank of the Bear River south of the Phase I mining area during early summer 2000 surveys. The bank swallow is a state-listed threatened species and has no federal special-status. The nesting area is located immediately adjacent to the river channel and is not within the area to be mined.

North Fork Associates has prepared a *Revised Biological Mitigation Plan (April 2001)* detailing the measures to be employed to protect the special status species and habitats identified on the project. The measures specified in the Mitigation Plan are included in this Reclamation Plan by reference and are found in full in Appendix B.

#### 4.2 Wetlands

A Wetland Delineation was also completed during the 1996 Biological Resources study. According to the 1996 *Biological Resources Report*, no wetlands occur in the project area north of the Bear River. The site has been characterized with deep sand and gravelly soils, which do not lead to, saturated soils conditions indicative of areas classified as wetlands. A letter of concurrence with the study findings of no wetlands prepared by the U.S. Army Corps of Engineers is included in Appendix B. There are wetlands on the south side of the river adjacent to the small pond at the southeastern corner of the project site and adjacent to the river within the Phase 1 mining area. These have not yet been verified by the Corps of Engineers.

### 5.0 MINING PLAN

#### 5.1 Surface Mining Plan

The mining operation is ongoing and plans for an additional 55-year project life in order to allow thorough development of the site resources and provide adequate time for site reclamation, final processing, and materials marketing. Types of aggregate materials mined and production rates vary during any given time period in response to market demand. The annual mine production has been estimated by the project operator at a maximum of 3.2 million tons, with an annual average of between 1.0 and 1.25 million tons. The total estimated production through the life of the project is considered to be approximately 69 million tons, based on the estimated reserves, and the currently permitted annual production limit and actual production. No in-stream mining is conducted or proposed as a part of this Plan. Sand and gravel mining at the project site has occurred continuously since 1956. The projected closure date for the mining operation is December 31, 2058, or at a time prior to that date when reserves are exhausted.

Current mining at the site includes excavation of sand and gravel in the permitted active pit areas north of the Bear River in Placer County.

Sand and gravel aggregate products (screened and crushed) along with a silty sand product marketed as a "topsoil" are the mined mineral commodities. A product list is included in Appendix B. Processing yields approximately 30% of the mined deposit as a sandy silt, which is not marketable. This unused sandy silt is currently used for levee construction, or is pumped as a slurry for backfilling into pit areas where mining has been completed or is stored for re-use in reclamation activities as a growth media - no waste material is generated requiring permanent stockpiling. The mined materials are transported from the pit to the plant and stored in surge piles located south of the Bear River where processing and shipping occur. The slurried unused sandy silts are currently piped from the plant to active settling ponds located north of the Bear River.

#### 5.1.1 Proposed Development

Project development plans include continued sand and gravel mining in the permitted Damon and Patterson Sand & Gravel properties areas, along with expansion to the north and west into the adjoining walnut orchards bounding the western side of the currently permitted mine site and to the south of the plant on Patterson property. The project proposes to phase the mining operation and reclamation activities over a 55-year span. Mining will be conducted in six phases through the anticipated life of the project. Mine phases in the permitted and expansion areas are presented on Sheets G3 through G8 in Appendix A. Mining Phases 1 through 5 will proceed from the currently active mining area (Sheet G2), north to the northern site boundary, move to the west and then to the south, to complete the mining of the aggregate resource north of the Bear River on Damon property. The permitted and previously mined area southeast of the Bear River in the northeastern portion of the project site on Patterson property, will be mined concurrently with Phase 1, and develop the un-mined deposits. Phase 6 will develop resources within the Patterson parcel of land south of the current processing plant and southwest of the access road. Gravel resources will be mined to an approximate maximum depth of 100 feet below the existing grade in Phases 1 through 5 except in the eastern end of the Phase 1 mining area south of the river where material will be removed only down to surrounding surface contours.

In general, reclamation will proceed in the project mined areas within approximately four years of initiation of mining within each phase. The exception to this schedule will be where reclamation consists of development of a water body in the mined area. As indicated on Sheet G10, a central lake approximately 300 acres in size will be developed within the central area of Phases 1 through 5 following completion of mining in those areas. Areas surrounding the lake in Phases 2 through 5, and in the northeastern portion of the project will be backfilled with silts and fine sands (mining by-products) to provide areas for Damon Estate agricultural development and production. These backfilling reclamation activities may begin in the areas peripheral to the central lake as mining is completed.

Three undisturbed "Preserve Areas" totaling approximately 83 acres, and the Bear River Preservation Corridor (110 acres), will be located within the project boundary as indicated on sheet G11. Additionally, approximately 112 acres of project area will be backfilled and restored as an oak woodland and elderberry mitigation corridor along the northwestern border of the Bear River outside of the river channel.

Near surface materials in portions of the proposed expansion areas consist of poorly graded SAND (SP). Damon Estate orchard growers have reported that these near surface soils have poor properties regarding nutrient and moisture holding capacities and therefore are not suitable for walnut production. The near surface poorly graded SAND as well as the gravels at depth will be mined for use as aggregate product. The sandy silt produced during sand and gravel processing is reported by previous mine operators to be more preferable regarding water holding and nutrient properties and is more desirable for use in orchard development. According to the property owners, orchards in the Phase 4 and 5 areas will have reached their useful lifetime by the time mining is proposed (after the year 2025), and the trees will be removed prior to mining. Backfilled excavations will be available for agricultural use in the areas indicated on Sheet G10 as "Agricultural Reclamation Land Use".

As a part of the proposed westward mining expansion, the existing levee north of the Bear



River will be extended to the west as indicated on Sheet G10. All levee extension construction will be outside of the Army Corps of Engineers "ordinary high water area" jurisdictional zone of the river channel. The extended levee will form the southern boundary of the mining area in Phase 1.

A proposed use addition at the site considers an asphalt plant, which is planned near the southwestern corner of the existing gravel processing area. Development plans for the site include filling the existing water retention ponds near the western boundary of the processing plant area. The filled ponds will provide an expanded area for the proposed propane-fired asphalt plant. As noted in Section 3.7.2 of this Plan, a foundation study will be completed and foundation engineering recommendations prepared for areas near the settling ponds considered for structural improvements related to the proposed asphalt plant prior to development design.

An approximately 11-acre expansion of the processing plant is planned south of the existing plant site, northwest of Phase 6.

#### 5.1.2 Permanent Stockpiles

Revegetation and proposed orchard fill materials are developed from the silts and sands that are salvaged as an unused byproduct of gravel production. Revegetation and backfill materials are also developed from a 2 to 5 feet thick layer of clayey and silty fine SAND which is encountered generally throughout the mine area north of the Bear River at 10 to 12 feet below the pre-mining surface. This buried strata of clayey and silty sand/growth media is currently excavated and placed as slope covering as it is encountered during the mining process, thereby precluding the need for stockpiling. The mining byproduct sandy silts are piped with plant wash water as a slurry and deposited in the settling ponds. The slurried sandy silts do not require stockpiling and maintenance. A high silt content "topsoil" material is developed during materials classifying and is currently stockpiled as a marketable product with the other sand and gravel product materials in the processing yard and are considered as temporary marketed stockpiles. No permanent stockpiles are anticipated on the project.

#### 5.1.3 Operation Roadways

Access and operation roadway locations are indicated on Sheet G2. Haul roads are currently located on the tops of levees, over the bridge crossing the Bear River, within the processing plant and within current and past excavation areas. The Bear River bridge crossing has been constructed with oversight from the Army Corps of Engineers and the California Department of Fish and Game

The mine access road from Camp Far West Road will be widened as a part of the mine expansion. The widening will provide additional parking for trucks entering the plant waiting for loading, and those exiting the plant checking loads and covers. A roadway and Camp Far West Road encroachment design is being prepared by Carlton Engineering, Inc

#### 5.1.4 Mine Development

The progress and timing of mining in the proposed phases is shown below, and on the Table in section 5.3. Expanded mining operations will continue through the current Phase 1 mining area to the southwest and west as well as in Phase 1 areas southeast of the Bear River as identified on sheet G3. Mining operations will move to the north into Phase 2 and Phase 3 areas following completion of Phase 1 mining as shown on Sheets G4 and G5. Following completion of Phases 1, 2, and 3 mining, the areas will be backfilled as indicated on Sheet G10 to provide additional agricultural area and vegetation mitigation areas. Mining will progress from the Phase 3 area west into the Phase 4 area indicated on Sheet G6 and will involve the removal of an older portion of Damon walnut orchards. Following completion of Phase 4 mining, the area indicated on Sheet G10 will be backfilled to provide additional agricultural area. Mining will progress south to the Phase 5 area, removing older Damon orchards, at the completion of Phase 4 mining as shown on sheet G7, and backfilling for agricultural use will proceed during reclamation activities for Phase 5. Phase 6 mining will commence on the Patterson property south of the processing plant following completion of Phase 5 mining (completion of Damon property mining). Phase 6 work is anticipated to complete the mining project.

A 100 feet wide buffer strip for screening and landscaping will be created between Camp Far West Road and the proposed top of slope of the Phase 6 mine area. A landscaping buffer will also be established along the southwestern boundary of the Phase 6 area.

The processing plant area is proposed to be expanded approximately 400 feet southeast of its current boundary as indicated on Sheet G8. The timing of mine development as presented on the following Table is projected, and is wholly dependent on aggregate product market conditions.

**PATTERSON SAND & GRAVEL**  
**PROPOSED PRODUCTION TIME LINE**  
**YEARS**

	2000	2010	2020	2030	2040	2050	2060
<b>Phase 1</b>							
Mining	■	■					
Reclamation		■	■				
<b>Phase 2</b>							
Mining		■	■				
Reclamation			■	■			
<b>Phase 3</b>							
Mining			■	■			
Reclamation				■	■		
<b>Phase 4</b>							
Mining				■	■		
Reclamation					■	■	
<b>Phase 5</b>							
Mining					■	■	
Reclamation						■	■
<b>Phase 6</b>							
Mining							■
Reclamation							■

#### 5.1.5 Surface Drainage

Streams and other surface waters on or adjacent to the site include the Bear River, the Camp Far West concrete-lined irrigation canal along the northern border of the project, and the canals along the north and south sides of Camp Far West Road near the southeastern boundary of the site.

Drainage/water body improvements will be constructed in conjunction with the mining operations. The improvements include one central lake north of the Bear River in the Phases 1 - 5 area, and maintaining existing conditions of the drainage channel near the northwestern boundary of the project (Sheet G9). The central lake along with the current settling ponds and mining pits will provide a complete interior runoff collection system with no surface runoff discharge to the Bear River.

Additional drainage improvements will include minimum 12 inches deep drainage ditches located along the toe of the intermediate mine pit-wall benches, which will discharge runoff to the interior basins through rock lined "down-drain" ditches during mining operations. The drainage course located along approximately 1600 feet of the northwestern project boundary currently drains a Damon property watershed north of the irrigation canal. The drainage crosses under the Camp Far West canal and onto the project through two 30-inch diameter culverts, and flows toward the west off the project. The existing drainage channel will be maintained as indicated in sectional view on Sheet G10 to convey the drainage off the project site and away from mining excavations. The top of the proposed mining slope will be located at least 20 feet from the side of the drainage channel.

#### 5.1.6 Final Landforms

The maximum anticipated depth of mine development will be approximately 80 to 100 feet below the original surface, at elevations of approximately 30 to 10 feet msl. The deepest excavations are anticipated to occur in the central area of Phases 1 - 5. Final re-contoured mine-pit side slopes will be constructed at a maximum slope of 2.25:1 (h:v) using slurried silty sand and clayey sand by-product/mining waste. One lake approximately 300 acres in size, with a water surface at an elevation of approximately 95 feet msl is proposed north of the river. Three undisturbed "Preserve Areas" will be protected within the project boundary, where the existing ground elevations, vegetation and habitats will be maintained. Re-contoured mine-pit side slopes will be constructed at maximum 2.25:1 angles, which will slope down to the planned final lake surface. A bench or shelf will be constructed at an approximate elevation of 93 to 94 feet msl around the perimeter of the lake that will range in width from 10 to 20 feet and will slope slightly toward the lake. The shelf will provide a shallow "shore" habitat for the lake environment.

One existing lake area will remain on the southern side of the river with a water level of approximately 124 feet msl. The area of the processing plant will be graded to a relatively level surface and made available for agricultural use. Existing levees north and south of the Bear River, and the proposed levee/haul road berm extension north of the River in the Phase 1 mine expansion area will remain on-site following completion of mining. The levees and berm will direct surface runoff that develops outside of the river channel, into the current and future closed drainage basins of the mine area.

A portion of the mine excavation area ranging from 300 feet to 600 feet in width along the north side of the Bear River in Phase 1 will be backfilled to near the original ground surface levels in order to provide a habitat corridor/buffer zone between the interior lake and the Bear River. The

backfill will consist of the sandy silt waste product from the mining process, which will be placed according to fill compaction specifications in section 5.4.9 of this Plan. This buffer zone will also be constructed to preclude the likelihood of downstream migration of the existing Bear River meander bend at the southern boundary of Phase 1 area eventually breaching a narrower section of land between the river and the proposed lake. The backfilled area will also provide an oak woodland and elderberry mitigation and habitat corridor adjacent to the river. This corridor will provide a connection between the project preserve area south of the Phase 5 mining area, the preserve area in the central portion of the project, and the restored oak woodland and elderberry mitigation areas in the eastern portion of the project.

#### 5.1.7 Mining Equipment

Equipment used at the site includes scrapers, loaders, excavators, haul trucks, dozers, service vehicles, a topsoil screen plant, two wash plants, and a crusher plant. Mined material is excavated by scrapers and excavators and is currently hauled to the processing area by scrapers and haul trucks. Mine plans include future addition of a conveyor from the mine area to the processing plant.

#### 5.1.8 Processing

The mined materials are processed either near the excavation area in a topsoil screening plant or in the main processing area south of the river. Gravel processing plant water is circulated within a closed system. Wastewater from the processing plant is combined with the sandy silt portion of the plant washings to create a slurry, which is pumped to settling/holding ponds where the fines are allowed to settle. Water from the settling ponds is piped back to the plant for re-use in the processing system following settlement of the fines. Make-up feed for the plant is obtained from pit groundwater ponds. With the existing equipment, the wash and crusher plants in the main processing area use water at a total rate of up to 4,500 gallons per minute (gpm).

The processing plants in the southern production area are powered by offsite generated electrical power supplied by Pacific Gas and Electric Company.

#### 5.1.9 Hazardous Materials

Operation of machinery at the site involves the use and storage of fuels and waste petroleum and automotive products. Above ground storage tanks are utilized for these purposes and include: 1) one 15,000 gallon diesel fuel tank, 2) one 1,000 gallon gasoline fuel tank, 3) one approximately 1,200 gallon waste oil tank, 4) one approximately 300 gallon used coolant tank. The storage tanks are permitted under Placer County ordinances regarding fuel/hazardous materials storage tanks.

#### 5.1.10 Buildings

A new shop building has been constructed north of the current structures on Patterson Sand & Gravel property (AP #18-031-061), removal of the former shop building is planned. The main office currently consists of a modular structure. Replacement of the office structure with a new office building is also planned. Truck scales are located adjacent to the main office at the southern entrance to the mine, near the western portion of the processing area and the settling ponds. All structures will be removed following termination of the mining and materials production activities

## 5.2 Public Health and Safety

The mine development area is located wholly on private lands. The project is bounded on the north by a concrete lined irrigation canal on private Damon Estate property. The southern property boundary along the Patterson Sand & Gravel portion of the site is fenced with cattle fencing, and borders Camp Far West Road in the southeastern portion of the project site. During mining of Phase 6, a six feet high chain link fence will be maintained at the property line to prevent public access to the mining operations from the Camp Far West Road area. Site access is controlled by a gate at the entrance to the mine site off Camp Far West Road, which is locked during non-business hours. The final slopes within the mine excavation areas will be constructed at a maximum slope angle of 2.25:1 (h:v), with 12 feet wide benches spaced at 30 feet vertical height intervals according to California Building Code Chapter A33 requirements. A gate will be maintained at the entrance as mine development continues, and also following completion of mining. No safety hazards will be present in the mine area following the end of the mining phases. Foot traffic in the area of the mine at the present time is relatively non-existent, and future public exposure is considered to be equally limited considering the lands are private.

## 5.3 End Land Use

Proposed post mining and reclamation land uses of the mining area will consist of wildlife habitat, watershed and agricultural development. The wildlife habitat and watershed areas will consist of lakes and emergent wetland habitats (one lake previously established at the northeast portion of the site), the undisturbed oak woodland preserve areas, Bear River Preservation Corridor; oak woodland/riparian habitat, and elderberry beetle mitigation areas. A continuous oak and elderberry mitigation corridor will be created from the southwest preservation area along the north side of the Bear River up to the 29-acre oak woodland preserve area located in the north central portion of the project. Agricultural development will occur, depending upon market needs, in the mined and backfilled areas northeast, north, west and south of the proposed lake in the central area of the project on Damon property (shown on Sheet G10). Rice fields may be developed in the mined and backfilled areas southeast of the Bear River on Patterson property.

PROPOSED PRODUCTION PHASING AND RECLAMATION END LAND-USE				
Mine Phase	Approximate Area (acres)	Projected Production Timing	Projected Reclamation Timing	Post Mining Land-Use
Permitted/ Completed Mine Areas	136	(Mining Completed)	Through 2005	Oak Woodland, Elderberry Mitigation, Agricultural
1	161	present-2016	2004-2020	Oak Woodland/Elderberry Mitigation, Lake, Agricultural
2	42	2004-2014	2008-2018	Lake, Agricultural
3	41	2014-2026	2024-2030	Lake, Agricultural
4	98	2026-2038	2030-2042	Lake, Agricultural
5	148	2038-2054	2042-2058	Lake, Agricultural (Prime Farmland – 58 acres*)
6 (includes processing plant)	65	2054-2056	2056-2058	Agricultural (Prime Farmland Farmland – 36 acres*)

\*Area of existing land classified as Prime Farmland.

The final configuration of the project site will be characterized by lake, agricultural, and native vegetation and habitat areas. Completed mining in the areas surrounding the proposed central lake northwest of the Bear River is proposed to result in leveled agricultural land suitable for development. The agricultural land will be constructed by backfilling the mined basins with un-used sandy silt mining by-product. The remainder of the mined site north of the Bear River will be occupied by an approximately 300 acre lake with emergent wetland around its shoreline, and a total of 112 acres of oak woodland/riparian/elderberry mitigation habitat including over 16 acres of 3:1 side slopes also available for elderberry mitigation mixed with oaks. Reclaimed lands on the south side of the Bear River will be occupied by one pond (existing), existing and proposed wetland expansion/enhancement areas, and by leveled areas available for agricultural development in the current processing plant site and Phase 1 and 6 areas. Slopes surrounding the lakes will be developed with oaks, cottonwoods and elderberry shrubs completing the re-establishment of native habitat of the area.

Approximately 269 acres of land currently developed with agricultural uses are planned for mining in Phases 2 through 6. Upon completion of reclamation activities at the end of the project's life, approximately 256 acres of land will be reclaimed to be available for agricultural development within the project boundary.

#### 5.4 Geotechnical Requirements

An *Exploratory Drilling* report for the site was prepared by *Raney Geotechnical* in January, 1998, and presents soil profile information obtained from 12 soil borings made at the site in August, 1997. The boring logs indicate that the groundwater level in the northern portion of the site, as determined from borings B1, B4, B5, B6, B7, and B8, varies from an elevation of approximately 75 to 95 feet msl. Boring B2 was conducted in an area of active mining at approximately 82 feet msl, and encountered groundwater at an elevation of approximately 54 feet msl (28 feet below the existing grade).

In April, 1999, 29 test holes were conducted for RMC Lonestar and samples were collected for evaluation of aggregate properties.

In February, 2000 CEI conducted an exploratory drilling program in the northwestern portion of the project consisting of 2 borings south of the existing concrete lined canal at the project boundary. The borings were terminated at 81 feet and 91.5 feet bgs. Groundwater was encountered in the borings at approximately 24 feet and 20 feet bgs (101 and 100 feet msl).

Based on the existing drilling report logs, the soils on the site north of the Bear River are generally described as brown, gray and white; loose; dry to moist; fine to medium SAND (SP) with medium to coarse gravel generally to depths of approximately 12 to 26 feet below existing grades with some areas of sand to 50 feet. Below the sand layer is a stratified combination of clayey, silty and well graded GRAVEL (GC, GM, GW), CLAY (CL), SILT (SM), clayey and silty SAND (SC, SM), and combinations of the above to the maximum depth explored of between 50 and 91 feet below existing grades. Materials were generally reported as being moist and medium dense to dense (gravels), moist loose-to-very stiff (silts and clays), and moist loose-to-medium dense (sands). Silty SAND (SM) was identified as "cemented" and saturated in Raney boring no. 2 at a depth of approximately 27 feet below grade. Groundwater was reported in the Raney study between depths of approximately 18 to 41 feet below existing grade. Granular materials below the reported water table were understood to be saturated if above a clay or silt strata.

##### 5.4.1 Clearing, Stripping and Preparation for Mining

Tree removal and stripping of surface vegetation will be necessary within mine development areas. In order to allow an adequate time to prepare the surface soils for mining including root removal and separation, surface vegetation material removal will be conducted prior to mining. However, removal will not precede surface mining activities by more than 12 months. As described in section 5.1.1, nutrient rich or agriculturally suitable topsoil is generally not present in the mining expansion areas (with the exception of Phases 5 and 6) and therefore topsoil removal, stockpiling and maintenance is not applicable to this Plan for mining Phases 1 - 4. In isolated areas throughout the project where topsoil quality material is identified, the material is currently sold as a product. Any unused topsoil quality material will be hauled to an area undergoing re-vegetation, spread at the surface and treated with erosion control Best Management Practices or permanently re-vegetated, thereby eliminating the need for stockpiling. Topsoil removal and replacement regarding Phase 5 soils and topsoil removal, stockpiling and maintenance/replacement regarding Phase 6 soils are described in the following paragraphs.

As described in Section 6.5 and 6.6.5, approximately 58 acres of *Prime Farmland* soils (*Xerofluents, occasionally flooded*) are mapped and categorized by the NRCD in the Phase 5 mining area. Site exploration drilling reports indicate up to 18 feet of fine silt in these areas. These soils will be excavated and placed in the agricultural reclamation land use areas in completed Phase 2 - 4 areas as mining proceeds in the mapped area of the categorized soil in Phase 5. Approximately 940,000 cubic yards (top 10 feet of profile) of the *Xerofluents, occasionally flooded* soils will be available for removal and placement at the finish surfaces in the agricultural reclamation land use areas within Phases 2 - 5.

As described in Section 6.5 and 6.6.5, *Prime Farmland* soils are also mapped and categorized by the NRCD in the Phase 6 mining area. The near-surface sandy loam and loam (to approximately 14 inches below the surface) and the sandy clay loam subsoil (from approximately 14 inches to 55 inches below the surface), which is identified in the SCS reports in the area of Phase 6 mining will be salvaged and stockpiled in un-mined areas of Phase 6 and moved/replaced as mining progresses. The two soil types will be stockpiled separately and stabilized to avoid erosion loss as described in section 6.6.1 of this plan. Following completion of Phase 6 mining, the salvaged soils will be replaced at the surface of the Phase 6 backfill, placed in the order of subsoil first and near-surface soil over the subsoil. Approximately 94,000 cubic yards of near-surface soils and 273,000 cubic yards of subsoil will be separated for agricultural reclamation soil reconstruction during Phase 6 mining.

The sandy silt and clay portions of the mined material which are separated by the processing plant as un-used byproduct will be used as growth media during the on-going reclamation at the mine. This material will be pumped as a slurry to the areas where pit backfilling is proposed, including the additional agricultural areas. The growth media will also be "stockpiled" in settling ponds for later transport to the haul road berm construction areas and application to constructed maximum 2.25:1 (h:v maximum) mine side slopes. The growth media will be placed in a manner such that erosion of the material due to rainfall and surface runoff will not result in sediment laden runoff flowing to the Bear River or the irrigation canal north of the site.

#### 5.4.2 Temporary Mining and Final Slope Inclinations

##### *Northwestern Area of Project - Temporary*

CEI's recommendations for maximum slope inclinations in the northwestern boundary area of the project (Phases 2, 3, and 4) are based on a subsurface study and slope stability analysis. Results of the analysis are summarized on the March 22, 2000 memorandum included in Appendix A of this Plan. Temporary and intermediate mining slopes in the areas bordering the canal at the northwestern boundary of the project should be constructed as follows: inclinations no steeper than 2:1 (h:v) in the observed top beds of loose sands; and inclinations no steeper than 1.75:1 in the dense clayey, silty sand and gravel below approximately 35 feet bgs. Tops of mining excavations adjacent to the canal should be located no closer than 50 feet from the southern edge of the canal.

##### *General Project Recommendations - Temporary*

Although temporary and intermediate cut slopes in some clayey sands and gravels may stand for a time at steeper inclinations, a maximum slope inclination of 1.75:1 (h:v below loose Sand) is recommended for the northwestern project boundary adjacent to the canal; and in the Phase 1/current mining areas adjacent to the Bear River. A maximum slope inclination of 1.5:1 (h:v) is recommended



below loose sand for other mining areas unless documented site conditions warrant a steeper inclination.

#### *General Project Recommendations - Final*

Final mining slopes in the expansion areas are estimated to be between 30 and 100 feet in vertical height, with the lowest base elevation for the cuts anticipated to be approximately 10 to 15 feet msl. The planned area of maximum depth mining with no anticipated agricultural or Oak Woodland/Elderberry Mitigation backfill is located in the central area of Phases 1 through 5. This area will be reclaimed as a lake with as much as 85 vertical feet of the slopes being below the anticipated final water level.

Final slopes in planned agricultural use backfill areas and areas bordering the Oak Woodland/Elderberry Mitigation areas near the central lake (below anticipated lake water level) which will be composed of the silty sand waste material, are recommended to be constructed at angles no steeper than 2.25:1 (h:v). Structures shall not be located closer horizontally to the toe of final slopes, than three (3) times the height of the slope. Other features such as the canal at the northwestern boundary of the project, or mining equipment should be set back from the top of mining slopes a minimum horizontal distance of 50 feet.

Side slopes in Oak Woodland/Elderberry Mitigation areas above the anticipated water level of the central lake are planned to be constructed at 3:1 (h:v) or flatter. Reconstructed slopes at random locations throughout the project may also be constructed at inclinations of 3:1 (h:v) or flatter.

Cut and fill slopes will be constructed in accordance with the California Building Code (CBC), 2001 edition, Appendix Chapter 33, *Excavation and Grading*. Cut and fill slopes between 30 and 120 feet in vertical height will be constructed with one bench at mid-height of the slope. Cut and fill slopes less than 30 feet in vertical height do not require benches. Benches should be a minimum of 12 feet wide and back-sloped. The benches should also be constructed to drain at slopes of 1% to collection down drains spaced at intervals of 300 to 500 feet. Where relatively low permeability materials exist at the bench elevation, benches will be constructed with shallow drainage channels to carry surface water to a location where it can be directed into suitable discharge locations within the site.

#### 5.4.3 Backfilling and Grading

The earthwork on this site includes all operations necessary to excavate materials and construct stockpiles (temporary); engineered slopes and benches; construct earthfills, access and haul roads; and construct haul road berms and levees. This includes, but is not limited to, excavation of trenches for culverts, subdrains, and other facilities, excavation of drainage channels, construction of embankments, preparation of the haul road berm sites, placement of backfill for culverts, backfilling trenches and other depressions, the removal of unstable material and miscellaneous work required for the excavation and placement of earthen materials within the site and adjacent thereto.

Grading activities will be accompanied by the use of a water spray truck for wetting areas of exposed soil to reduce the development of fugitive dust.

#### 5.4.4 Landslides and Mudflows

The project site is relatively flat near an elevation of between 100 feet in the southwest and 140 feet msl in the northeast. The area east of the site is characterized by rolling foothill terrain and becomes steeper closer to the Camp Far West reservoir approximately 3 miles to the northeast. The reservoir spillway elevation is approximately 300 feet msl. The area around the western portion of the site becomes flatter toward the Sacramento Valley. Based on the area topography, the possibility for landslides and or mudflows appears to be remote.

#### 5.4.5 Weak Soils and Expansive Soil

The majority of the site soils identified are clayey and silty sands and gravels. A relatively thin clay layer was identified in many of the borings at elevations of approximately 50 to 80 feet msl. The strata were not tested to identify material properties beyond material classification and hence no site-specific soil data is available to characterize the expansive potential of this material.

The SCS has identified the near surface site soils to a depth of 60 inches within Placer County (Rogers, 1975) as *Xerofluvents, sandy*, which are classified as stratified sand and loamy sand (SP-SM, SM); *Xerofluvents, occasionally flooded* and *Xerofluvents, frequently flooded* which are classified as having variable characteristics; *Riverwash*, which is classified as a "highly stratified stony and bouldery sand that is typically barren"; and *Ramona sandy loam* described as sandy loam, loam, sandy clay loam, gravelly sandy loam, and gravelly coarse sandy loam (SM, ML, CL-ML, SC, SM-SC). *Riverwash* is described as being subject to scouring, cutting and deposition, depending on river bed load. This unit exhibits rapid permeability with rapid surface runoff and a high erosion hazard and is inundated by yearly flooding.

The SCS has identified the near surface site soils to a depth of 60 inches within Yuba County as: *Columbia fine sandy loam* which are described as fine sandy loam, sandy loam and stratified sand to silt loam (SM, SM-SC); and *Holillipah loamy sand* which are classified as loamy sand and stratified silt loam to sand (SM); and *Dumps, mine tailings* which are classified as materials dredged from river channels and flood plains during gold mining operations mounded in long narrow tailings piles.

The SCS has reported limited soil engineering and chemical properties for these soils. The risk of corrosion to steel is reported as low for *Xerofluvents, sandy*; high for *Xerofluvents, occasionally flooded* and *Xerofluvents, frequently flooded*; and moderate for *Ramona sandy loam*. Risk of corrosion to concrete for these soil types is reported as low and moderate for the *Ramona* soils. For *Xerofluvents, sandy* the pH is reported to range between 6.1 and 7.8, the Plasticity Index is reported as non-plastic (NP), the soil has a low shrink-swell potential, and 5 to 30 percent passes the #200 screen. Plasticity Index, pH, shrink-swell potential and percent passing the #200 screen are not reported for *Xerofluvents, occasionally flooded* and *Xerofluvents, frequently flooded*. For *Ramona sandy loam* the pH is reported to range between 5.6 and 7.3, the Plasticity Index is reported as non-plastic (NP) to 10, the soil has a low to moderate shrink-swell potential, and 15 to 60 percent passes the #200 screen. The Plasticity Index is reported as NP for the *Columbia* unit, and NP to 10 for the *Holillipah* unit. In the *Columbia* unit, 30 to 50 percent is reported to pass the #200 screen, and 10 to 30 percent is reported to pass the #200 screen in the *Holillipah* series.

#### 5.4.6 Differential Settlement

The majority of the existing site soil within the range of anticipated mining operations is of low expansiveness and is coarse-grained material in a damp to wet state and a loose to dense condition. The depth to groundwater, as identified by the exploration information indicates a variable water depth across the site. Structures and mining equipment founded on the medium dense, damp coarse-grained material should not experience excessive differential settlement. However, structures and mining equipment founded near clay or near a fluctuating water table, could experience excessive differential settlements in response to changes in groundwater elevations or changes in structural loadings including cyclic or vibratory dynamic loadings. In particular, large amplitude and/or high frequency dynamic vibrations from large mining equipment and machinery may have the potential to cause settlements in granular materials which have a high water content and little fines. These factors should be taken into consideration when planning operations at the site.

The areas where fills are proposed for reclamation purposes in the mining areas are not considered for use as building sites or for other improvements sensitive to settlement. A specific foundation study is recommended for the retention pond area west of the main processing plant prior to placement of proposed asphalt plant structures in that area.

#### 5.4.7 Temporary Trench-wall Stability

In general, loose silty fine SAND with medium GRAVEL is anticipated within the upper 10 to 20 feet bgs. This soil is expected to have the potential for sloughing and trench wall instability. Trenches in this material shallower than five (5) feet will be sloped back at 2:1 (h:v) or flatter. Trenches deeper than five (5) feet should be shored below five (5) feet and should be sloped back at 2:1 (h:v) or flatter, above five (5) feet.

This discussion applies when a sloping or benching system is designed in accordance with the requirements set forth in OSHA Standard 1926.652(b)(2) as a method of protection for employees from cave-ins. This discussion also applies when timber shoring for excavations is designed as a method of protection from cave-ins in accordance with appendix C to subpart P of part 1926, and when aluminum hydraulic shoring is designed in accordance with appendix D. This Appendix also applies if other protective systems are designed and selected for use from data prepared in accordance with the requirements set forth in 1926.652(c).

On the basis of the existing information, we conclude that the mining site is generally underlain by granular cohesionless soils that classify as Type C Soil by OSHA Standard 1926 Subpart P App A - Soil Classification. "Type C" soil means granular soils including gravel, sand, and loamy sand; or submerged soil or soil from which water is freely seeping.

Soil exposed within trenches greater than five feet in depth will be shored or sloped back in accordance with OSHA standards, or certified safe for entry by the Engineer or Engineering Geologist in accordance with the OSHA regulations if personnel are to enter the excavation

#### 5.4.8 Erosion of Graded Areas

Drainage and moisture control measures will be incorporated from Section 1812, Chapter 18, Division II of the California Building Code, 2001 edition. Erosion control measures will be implemented for exposed surfaces, which may be subject to soil erosion and subsequent off-site sedimentation during periods of intensive rainfall. Additionally, saturated conditions in this soil material are anticipated to limit accessibility to the site and to restrict grading activities.

Interim and final erosion control measures are presented in Section 6.1 - Erosion Control.

#### 5.4.9 Levee Construction

This Plan includes continuation of the levee on the north side of the Bear River within the previously permitted area. The levee is planned to connect to the southern terminus of the existing levee at the north side of the Bear River approximately 1600 feet west of the bridge, which provides access to the mining areas north of the river. The new levee will terminate near the southwestern corner of the permitted Phase 1 area. The levee will be constructed with top elevations approximately 121 feet msl in the east and approximately 115 feet msl in the west.

The levee will be built against to the planned side slope (cut slope) of the mining area. A levee detail is included in this Plan on sheet G1. Following completion of mining north of the levee, the mined area will be backfilled as described in section 5.1.6 of this Plan.

Levee construction should begin by clearing all vegetative matter and other deleterious materials from the area where levees are planned and a minimum of five feet beyond. This will include the stripping of grass, weeds, shrubs and bushes, trees, and other vegetative growth to include their roots larger than 2 inches in diameter from construction areas including the mining side slopes against which the levee will be constructed.

Levees should be keyed in to the mine floor a minimum of 5 feet below lowest adjacent grade for the full width of the levee base which is planned to be approximately 42 feet. Temporary mining slopes in the areas where levees are to be built are estimated to be between 80 and 100 feet in height with base elevation for the cuts anticipated to be at an approximate elevation of between 35 and 15 feet msl. Cut and fill slopes will be constructed in accordance with the California Building Code (CBC), 2001 edition, Appendix Chapter 33, *Excavation and Grading*. Cut slopes which levees will be built against should be constructed with benches no farther apart than 5 feet vertically. As indicated on detail 3 on Sheet G1, levees should be constructed with mid-height benches when greater than 30 vertical feet in height, and side slopes no steeper than 2.25:1 (h:v).

Levee material should be placed in uncompacted lifts not exceeding 8 inches. Material should be compacted to a minimum of 90% of the maximum dry density as determined by the ASTM D1557 test method, and at a moisture content of between 2 and 4 percent above the optimum. Alternatively, material may be compacted to 95% of the maximum dry density as determined by the ASTM D698 test method, and at a moisture content of between 2 and 4 percent above the optimum.

All exposed levee surfaces will be protected from erosion by implementation of Best Management Practices (BMPs) such as placement of straw wattles, surface roughening, placement of

silt fencing, and planting native grasses as recommended in section 6.1 - Erosion Control. The top of the levee shall be sloped at a minimum of 1% to drain toward the mine excavation, and a berm shall be constructed at the top on the river side.

#### 5.5 Groundwater and Water Quality

The materials encountered in exploratory borings indicate that the site material is a stratified mixture of clays, silts, sands, and gravels, with the majority of the material in the borings classified as sands and gravels. This material is expected to have lenses of relatively high permeability, which could result in rapid changes in groundwater surfaces in response to agricultural irrigation, groundwater pumping, local storm water runoff rates, and other factors. Cementation of soils was not noted during previous or CEI investigations within depth ranges anticipated to affect site mining activities or the site hydrology. However, clay strata were detected by exploratory borings indicating the possibility for perched water conditions at the site. The extent of perched water conditions could vary depending on the permeability and horizontal extent of the clay strata, as well as the factors mentioned above.

As described in section 5.4, CEI has observed, and previous exploration studies at the site have reported groundwater in high permeability zones or lenses approximately 20 to 30 feet bgs in the northern portion of the Project. Observations of existing excavations in the mined areas of phase I and reports of exploration borings indicate that there is little to no transmission of groundwater from the Bear River channel into the mine areas immediately north of the river. Low flows of groundwater were observed from the north into the site excavations at the Northeast portion of phase I and are reported to originate from the historic channel of the Bear River which was located near and north of the Placer and Yuba County line prior to extensive hydraulic mining activities and subsequent sediment deposits in the mine area during the late 1800s.

The proposed mining area excavations are anticipated to reach maximum depths with elevations of approximately 10 to 15 feet msl. Based on the depth to groundwater observed during CEI exploration and as reported by previous investigations, excavations carried to this depth could encounter groundwater, and the possibility of this condition should be anticipated. Upon completion of mining activities in each phase, "mining waste" material (sandy silt and clay) will be used to construct new levees, backfill mined areas where re-constructed land intended for agricultural and habitat use is planned. The sandy silt and clay will also be placed on the floor of the mine pit and side slopes as mining reaches termination excavation depths, to serve as growth media and act as a barrier to fines contained in water, which may recharge groundwater zones.

During the mining operations and upon completion of reclamation, surface storm water runoff resulting from rainfall on the site is anticipated to be trapped within the mining excavation and pond areas. This water is expected to infiltrate through growth media material (sandy silt and clay) and existing sand and gravel strata as groundwater recharge. Site drainage ways will be maintained to carry runoff away from the Bear River and the irrigation canal to the north of the site, and into mining excavation areas, or to one of several existing or planned temporary ponds or basins on the site.

Mining operations are anticipated to result in the compaction of exposed soils in the areas where equipment is located and materials are processed, and where haul routes have been established. The compaction of the exposed materials at finish and intermediate grade excavations could inhibit

infiltration of surface waters affecting groundwater recharge and revegetation efforts. During active mining periods and upon completion of mining activities in individual areas and sub areas, grading should be performed to return the area to a uniform grade. Following this, remaining surface materials which have been compacted as a result of these operations should be scarified or disced at least 12 inches in depth, or deeper if needed to loosen heavily compacted areas, to allow for the infiltration of storm water runoff as well as the establishment of vegetation and wildlife habitat.

#### 5.5.1 Drainage

Phase 4 mining will include modification to the existing drainage system located southerly and parallel to both the existing canal and (levee) access road. An upstream drainage area north of the project site on the order of 350 acres was identified and delineated on a USGS Quadrangle Map and then confirmed by field observation. Flows from the upstream shed are conveyed onto the project (Phase 4) through a double 30" culvert located approximately 150 feet upstream of the angle point in the canal, near the northeast corner of phase 4.

Surface flows proceed from the culvert system to an existing drainage swale with top-widths ranging from 15-20 feet, and an overall depth of approximately 3 feet. The drainage swale is located approximately 20 feet southerly and parallel to the canal near the northerly boundary of phase 4. In addition to the existing canal and swale, an overhead electric line was observed within a portion of the drainage swale.

Proposed development in this phase will require grading activity consisting of placement of fill along the southerly portion of the drainage channel to increase the conveyance area for the system and provide a uniform section along both sides of the channel. An overbuilt section will be extended immediately behind the berm to provide support and stability between the drainage channel and future mining activity.

Setbacks in support of the proposed mining activity have been identified in consideration of the existing features within phase 4. Overall, a twenty (20) foot setback is recognized as a minimum from the drainage swale and overhead pole lines. A setback of fifty (50) feet has been identified from the existing canal to the top of mine excavations. Figure G9 is attached to denote existing features and overall topography along the northern limits of Phase 4, as well as the canal and drainage swale with the recommended mining setbacks.

#### 5.6 Management of Mine Waste and Overburden

The majority of surface materials in the proposed expansion areas consist of poorly graded silty fine SAND, which is used as a product, consequently no overburden is removed and stockpiled. Waste material from mining operations consists of silty sand and clay. This material is currently used and proposed for continued use in the construction of new levees and as growth media for those areas where mining has been completed. In isolated areas where topsoil quality material is identified, the material will be hauled to an area undergoing re-vegetation and spread at the surface as a growth media. Prime Farmland soils handling is described in this Plan in Section 5.4.1 Clearing Stripping and Preparation for Mining.

### 5.7 Dust Control

A speed limit of 10 mph is posted on the unpaved haul road accessing the mine and production areas. Roadway watering by water truck and speed limits are the primary dust control measures for the project. The coarse sand and gravel nature of the mine products will inhibit generation of fugitive dust in materials stockpiles. The stockpiles will be periodically wetted by water truck to insure a minimum of dust generation due to wind blowing across the stockpiles.

## 6.0 MINE RECLAMATION

### 6.1 Erosion Control

During the mining phase, activities at the site will conform with Placer and Yuba County Grading, Erosion and Sediment Control Ordinances. Work at the site will include maintenance of interim erosion control materials and structures until final reclamation practices are implemented.

Interim erosion control measures are to be performed in areas planned for mining expansion and new levee construction.

Upon completion of mining activities, mining area and planned agricultural area side slopes will be reclaimed by planting native grasses; elderberry bushes; and native oak, willow, cottonwood, and coffeeberry species, to establish animal habitat and an aesthetically acceptable appearance. Details of these plans can be found under section 6.6 - Revegetation.

All levee side slopes shall receive storm water pollution prevention Best Management Practices (BMPs) immediately after construction to help prevent erosion, which may be detrimental to the integrity of the levee. Exposed levee slopes are anticipated to be approximately 5 feet in vertical height on the side facing the Bear River, and up to a maximum of 100 vertical feet on the mine pit side. The interior slope will be constructed with a 12 feet wide mid-height bench and will be no steeper than 2.25:1 (h:v). The mine pit on the north side of the levee will be backfilled to approximately the elevation of the pre-mining surface for a distance ranging from approximately 200 to 600 feet north of the levee to provide the buffer zone/habitat corridor described in section 5.1.6 of this Plan. Levee slopes should be constructed in accordance with the recommendations presented in section 5.4.9 - Levee Construction, of this Plan.

Upon completion of levee construction and prior to BMP implementation, levee side slopes will be track walked with heavy equipment to roughen the surface and provide conditions more suitable for the establishment and success of re-seeding applications and vegetative growth.

BMPs for levee slopes should consist of placement of straw wattles staked to the slope face at intervals not to exceed 15 feet (slope distance) and revegetation with native grasses (there should be at least one straw wattle placed on any levee slope of eight feet or more). In the southwestern area of Phase 1 where the land behind the levee is to be backfilled as a buffer zone/native vegetation-habitat corridor, BMPs including surface vegetation will be removed prior to backfilling. Details of BMPs are included on sheet G1.

## 6.2 Disposition of Old Equipment and Structures

All equipment and structures will be removed from the site upon completion of the mining and processing operations of the project.

## 6.3 Environmental Setting and Protection of Fish and Wildlife Habitat

Wildlife habitat shall be established on land disturbed by mining operations to a condition at least as good as that which existed prior to mining operations. In order to achieve this goal, reclamation has been designed for the site to provide a varied and balanced habitat compatible and substantially similar to that of the surrounding areas and that, which existed prior to surface mining operation. The proposed mining areas which are not intended for backfill and redevelopment as agricultural lands will be reclaimed as *Lakes, High and Low Riparian Habitat, Oak Woodland, and Elderberry Beetle Mitigation areas*. Undisturbed *Preserve Areas* will be retained and along with the reclaimed areas, will become integrated with the existing habitat in the surrounding area providing a continuous corridor along the north side of the Bear River through the project. The following habitat mitigation measures will be implemented upon completion of mining operations in the existing and expansion areas:

- *Lakes* - 317± acres;
- Mining excavation side slopes will be planted with native oak tree species and grasses;
- *Elderberry Mitigation Areas* will be established in the northeast portion of the previously permitted mining area and in other reclaimed areas southeast and northwest of the proposed central lake;
- *Oak Woodland/riparian* habitat north of Bear River -112± acres; including 16± acres of revegetated 3:1 side slopes around east end of lake and the Elderberry Mitigation Areas (approximately 15 acres).

## 6.4 Backfilling, Regrading, Slope Stability

Regrading of the site will consist of smoothing the existing cut slopes to slopes no steeper than 2.25:1, and constructing benches at required heights on cut slopes exceeding 30 feet in vertical height in accordance with Chapter A33 of the 2001 edition of the California Building Code. The final site grading configuration will be accomplished concurrently with mining where possible. Spreading the growth media over the mine slope faces, and level areas will occur as needed to provide a growth medium approximately 6 inches thick on the mine floor and mine slopes.

The areas where fills may be placed, such as constructed oak woodland and planned agriculture areas will not be used for building sites or other improvements sensitive to settlement, and therefore do not require compactive efforts beyond those of the mechanical placement of the materials.

All fill slopes will be finished at slope angles no steeper than 2.25:1 (h:v). No permanent piles or dumps are anticipated.

If structures are intended to be constructed in an area which is to receive fill materials, the material must be compacted as engineered fill in accordance with generally accepted engineering practices. In general, this includes placing material in maximum 8 inch uncompacted lifts, followed by



a compactive effort which results in at least 90% relative compaction as determined by ASTM D1557 test method, and at a moisture condition of between 2 and 4 percent above the optimum. Structural improvements will not be constructed without a foundation study conducted in the area of the proposed improvements.

#### 6.5 Topsoil Maintenance and Resoiling

Phase 1 - 6 area mining will be conducted from the existing surface grades to maximum depths of approximately 100 feet below existing grade. As described in Section 6.6.5 of this Plan, the USDA Natural Resources Conservation District (NRCD) and the State Division of Land Resource Protection (DLRP) have developed an agricultural land ranking system defining categories of lands with specific soil types including *Prime Farmland*, and other categories of *Non-Prime Farmland*. The project soils identified by the SCS reports as *Prime Farmland* soils are the sandy loams in the *Ramona* soil series and the *Xerofluvents, occasionally flooded* soils.

*Ramona* soils are mapped in the Phase 6 mining area, and to a lesser extent in the southwest corner of the Phase 1 mining area on the southeast side of the Bear River. Phase 1 *Ramona* soils have been disturbed by previous mining activities, and are not shown on the DLRP maps as *Prime Farmland*. The Phase 6 topsoils will be salvaged and stockpiled in un-mined areas of Phase 6 and moved/replaced as mining progresses.

*Xerofluvents, occasionally flooded* soils are primarily located in the central area of Phase 5 and are reported to have a variable composition with no distinct soil horizons. Approximately 940,000 cubic yards of the *Xerofluvents, occasionally flooded* soils will be available for removal and placement at the finish surfaces in the agricultural reclamation land use areas within Phases 1 - 5 as these suitable soils are identified during the mining process.

Phase 1 - 5 mining areas are classified as *Prime* and *Non-Prime Farmland*. While topsoil quality soils are found in portions of this area, Damon and Patterson operators have indicated that there are zones within these areas where the fine sand near-surface material (SM, SP) is not suitable for agricultural purposes due to the poor moisture and nutrient holding capacity. The mined material is reported to yield approximately 30% sandy silt, which is unusable as a product. The unused mixture of sandy silts and clays is the material currently used, and planned for continued use as a growth media during reclamation.

The growth media is considered to be "stockpiled" by pumping it as a slurry from the processing plant to settling ponds in completed mine development areas. Placement of the slurried material is conducted so as to minimize its repeated handling or moving, by slurry-filling in areas where mining operations have been completed. The lens of loamy material encountered 10 feet to 12 feet below the original grade in areas throughout the project is also used as growth media, and is excavated and placed over final graded areas as it is encountered during the mining process.

Growth media will be planted and revegetated as it is placed to final grades in order to minimize erosion of the final surface cover. As an interim erosion control measure according to Placer and Yuba County Grading, Erosion, and Sediment Control Ordinances, silt fence will be installed near the toe of slopes that could contribute to off-site sedimentation. This would include slopes facing the

Bear River that have not been re-vegetated prior to October 15 of any year during mine operation.

The settling pond locations are recommended to be established within areas where mining is completed in order to reduce the potential for wind erosion by maintaining a low profile within the material. Initial placement of the backfill material is accomplished by location of the slurry transmission pipes behind dikes where backfilling is to take place. The settling areas slowly fill until the desired depth of fill or finish elevation is reached.

Growth media stored in previously active settling ponds will be spread over areas exposed by mining and graded to a final slope or surface configuration. A minimum of six inches of sandy silt growth media will be spread over the reclaimed surfaces prior to seeding. A straw mulch will be spread over the revegetation areas subject to erosion after seeding/planting.

Estimates of mineable reserves have been prepared for Patterson Sand & Gravel based on limited subsurface information, and requiring interpretation and projection of strata thickness for great distances between information points. The estimates indicate that approximately 57 million cubic yards of material could be mined from the permitted and proposed mining phases at the site over the projected life span of the operation. Of that total mineable volume, approximately 35 million cubic yards of material would be considered as product (69 million tons) based on Patterson production estimates of unusable fines portions of the currently mined materials, and based on Patterson exploration drilling and analysis results. Approximately 22 million cubic yards are considered to be available for backfilling to provide areas for future agricultural development and habitat areas at the site, for re-shaping slopes and mined surfaces, and for growth media.

Additional materials for re-contouring or excavation backfill may include clean imported earth materials. Imported backfill would supplement the on-site waste materials and would be hauled to the site using trucks returning to the mine from deliveries, no extra truck trips would be generated for backfill import.

## 6.6 Revegetation

To satisfy the primary aesthetic goals of creating a visually pleasing landscape and topography along with establishment of wildlife habitat and areas available for agricultural development, revegetation of the mined areas shall be necessary. Screening of views of the mine area from adjacent properties will be accomplished through the use of tree curtains and sloped embankments. The low topographic relief of the surrounding area and the natural barrier created by the Bear River will aid in screening the mine site from publicly accessible viewpoints. Basin side slopes and benches that will result from final excavation and grading of the site will be covered with protective herbaceous vegetation and woody vegetation similar to that of the pre-mining condition of the site.

The revegetation procedures presented in this Plan are composed to allow flexibility regarding species availability and future industry improvements. Performance standards current at the time of the work will be applied to the project considering the extended period of time prior to implementation of the final revegetation procedures. Seeding and straw mulching as recommended by the NRCS and described in the following sections 6.6.1 and 6.6.2 will be adhered to in areas where off-site sedimentation could occur from erosion of bare slopes. These conditions would be anticipated to occur

in newly completed levee sections facing the Bear River where completion of revegetation satisfactory to NRCS standards has not occurred prior to the onset of the rainy season. Recommendations regarding species, species richness and performance standards presented in this Plan will be followed during revegetation which is undertaken as a matter of course during and immediately following closure of mining in any one area (Production Timeline, Section 5.1.4).

Established local plant communities provide seed for the spread of vegetation very effectively. However, additional seeding and planting of woody species will augment the herbaceous revegetation and the natural succession/colonization of the site. To provide a uniform covering of seed on the site, the process of broadcasting a seed/fertilizer mixture by mechanical methods will be most applicable considering the size of the areas to be revegetated. Prior to broadcasting seed, the site seedbed shall be properly prepared and growth media placement completed.

#### 6.6.1 Proposed Revegetation Mix

Basic vegetative cover design is presented according to NRCS recommendations to primarily protect disturbed slopes outside the mine area as in the bridge/haul road side slopes and newly constructed levee slopes facing the Bear River. Erosion control measures are also to be applied to the Phase 6 topsoil and subsoil stockpiles placed in Phase 6 mining areas until completion of mining and backfill. Vegetative cover is to be established as soon as construction has been completed and final slopes have been graded. Herbaceous species seeds will be applied at the rate specified according to NRCS standards for MLRA 18. The recommended mix and seeding rate is composed of: Blando Brome at 18 lbs/ac; Rose Clover at 12 lbs/ac; and optional California Poppy or Lupin at 2 lbs/ac. An ammonium phosphate fertilizer (16-20-0) is to be applied at a rate of 500 lbs/ac. Seeding shall take place in the early fall between September 15 and October 15 to take advantage of the first fall rains for germination and plant establishment.

Broadcasting should be completed with a tractor mounted automatic seeder. Prior to mechanical broadcasting, grass, legumes, and fertilizer may be mixed together, provided they are approximately the same grain size. If the seeding mix is comprised of varying grain sizes, several broadcasting applications will be required, one for each grain size. To facilitate the growth and protection of the broadcasted seeds, raking and coverage with approximately ½ inch of soil may be required immediately following broadcasting.

#### 6.6.2 Straw Mulch

Following seeding, The final slope areas are to receive a straw mulch cover, using clean rice, barley or wheat straw. The straw mulch shall be spread or blown in to create a cover depth of 2 to 3 inches at a rate of 2 tons/ac. Straw mulch is to be anchored by punching the material into the growth media. The straw may be punched using either a roller punch or a crimper punch, which can be pulled behind a track layer tractor or pulled up and lowered down slope by cable. When using a crimper, two passes are to be made across the mulched area. The final pass is to be conducted across the slope.

On-going revegetation in completed zones within active mining areas (interior draining basins) may use the NRCS slope treatment techniques described previously or may use alternate techniques found through past experience to produce equally successful results. On-going revegetation in these areas will incorporate processes and species as described in sections 6.6.3, 6.6.4 and 6.6.5.

### 6.6.3 Revegetation Procedures and Species

Revegetation will proceed on recontoured slopes and abandoned road improvement areas following completion of work and prior to the onset of the fall rains. Mine slopes and excavation floors will be resoiled and revegetated following the completion of the work within each mining area as mining and earthwork are completed.

Spreading of the stored growth media will augment the herbaceous revegetation of the site. The local and planted species that will have established in the filled settling pond areas, will contribute seed to the spread media and further the natural succession/colonization of the site.

In order to provide habitat similar to surrounding lands and to those existing prior to mining in the site area, additional woody species characteristic of the annual grassland, oak woodland and riparian woodland will be planted at the site. Valley oak (*Quercus lobata*), interior live oak (*Quercus wislizenii*), Fremont cottonwood (*Populus fremontii*), sandbar willow (*Salix exigua*), Gooding's Willow (*Salix gooddingii*), Arroyo Willow (*Salix lasiolepis*), California Black Walnut (*Juglans californica*), and coffeeberry (*Rhamnus californica*) among others, will be planted throughout the reclamation areas. Seedlings and seed from these species are available on site for transplanting to nursery areas or final planting sites during and prior to clearing for expansion of mining operations.

The list of plant species observed at the site, which is included in the Biological Resources Report in Appendix B, provides a species inventory that can be used to select additional or alternative species for planting. At least 10 woody species and a combination of 15 annual and perennial species will be planted/sown.

As indicated in previous studies for the site, oaks may be planted on the mining side slopes, within the elderberry mitigation area and in the riparian zones at a ratio of 20 : 1 (2¼" square x 5" long container size) to mitigate the projected loss of approximately 670 oak trees at full project development. Likewise, cottonwoods may be planted at a 20 : 1 ratio (2¼" square x 5" long container size) to mitigate the potential loss of approximately 50 cottonwood trees. These ratios consider a survival rate of 50% throughout the site except in the elderberry mitigation area where 60% survival will be required. Should test plots developed on the site indicate that browsing mammals damage a large percentage of the seedlings, protection methods such as wire fence cages or placement of chemical deterrents such as garlic sticks can be utilized. Considering the duration of the mining project, new information may become available by the time the final revegetation is conducted and consultation with public agencies such as the NRCS and Caltrans may yield information that would allow for a more successful revegetation outcome.

A water truck will provide necessary water to maintain the plant growth should seeding and planting not be soon followed by rains. Supplemental watering will prevent a potential for over drying of the newly germinated plants. The supplemental watering can be provided until fall storm events become adequately frequent to maintain required moisture levels in the seedbed. The deep rooted erosion control grasses specified by the Natural Resources Conservation District will be naturally self maintaining following initial grass establishment during the first winter/spring cycle. No further human intervention regarding erosion control vegetation cover should be required beyond establishment.

#### 6.6.4 Revegetation Success and Performance Standards

Revegetation and performance standards for the project apply to lands outside of the areas proposed to be available for agricultural development. As outlined in SMARA, the following revegetation performance standards will pertain to the project:

- Re-establishment of a vegetative cover similar to the naturally occurring habitats in the surrounding area. This vegetative cover shall be capable of re-generation without the intervention of irrigation and non-native agricultural practices.
- Test plots of the proposed revegetative cover shall be established in areas where mining has been completed on side slopes and in basins, to determine optimum species and planting densities and refine revegetation treatments.
- In areas where surface compaction has resulted from mining activities or growth media replacement, a suitable root zone shall be established with the use of discing, ripping, or other mechanical means.
- Traffic areas to be reclaimed shall be cleared of road base materials and covered with suitable growth media to provide adequate root zone media.
- Dependant upon the results of test plots, an analysis of existing soils conditions may be required to determine the presence or absence of essential elements for proper vegetative growth. Care will be given to simulate the natural growth cycles when considering fertilizers or other suitable soil growth admixtures, slow release fertilizer will be considered.
- Preservation of the revegetated areas from grazing, trampling, or other forms of traffic will be required during their development. Protection from vehicles and other traffic shall be controlled with the use of fencing and imposed travel restrictions for designated roadways. In the event of excess erosion and degradation of the supporting soil materials, replacement of topsoil and lost vegetation shall be performed.
- Seeding shall take place in the early fall to take advantage of the first fall rains for germination and plant establishment. Oaks, cottonwoods, alders, willows and elderberries will be planted according to appropriate seasonal timing.
- To ensure successful revegetation establishment, proper erosion control and stabilizing practices - BMPs - shall be enacted as described in section 6.1 of this Plan.
- Irrigation measures are proposed to aid in plant establishment. The vegetative species will demonstrate that they can be self-sustaining for a minimum of 2 years.
- Species identified as noxious weeds shall be managed to prevent endangerment to revegetation efforts, control proliferation, and to mitigate the potential for fire hazards.

As a baseline performance standard, the success of the revegetation will be in part judged by the effectiveness of the vegetation establishment when compared with the native vegetative cover, density, and number of species existing prior to mining activities. Performance standards for seeded areas will be 80% cover with no bare areas larger than 10 feet x 10 feet.

Pursuant to California Administrative Code Title 14, Division 2, Chapter 8, Subchapter 1, Article 9, Section 3705(j), the success of revegetation will be monitored for three years, or until performance standards are met, provided that, during the last two years, there has been no human intervention, including, irrigation, fertilization, or weeding. Remedial measures will be implemented as necessary to achieve the performance standards.

#### 6.6.5 Prime Agricultural Lands

The majority of the proposed mining within the project is not located on soil types classified by the USDA NRCD or the State DLRP as *Prime Farmland*. The Patterson Sand & Gravel mining Phase 6 area has been used for rice production, and Damon property in Phases 1 - 5 has been used for walnut production. The central portion of Phase 5, and the area of Phase 6 have been classified by the NRCD and the DLRP as *Prime Farmland*.

##### *Prime Farmland*

The Phase 5 land classified as *Prime Farmland* is planned for mining, and subsequent lake reclamation land use. The land within the Phase 5 mining area categorized as *Prime Farmland* consists of approximately 58 acres according to NRCD soil survey maps and the mapped extent of the *Xerofluvents, occasionally flooded* soil type. No distinct soil horizons are described for these soils in the soil survey. Exploration drilling performed for RMC indicates that a material described as fine brown silt was encountered to depths ranging from 10 feet to 18 feet below the ground surface in borings conducted in the area categorized by the NRCD as *Prime Farmland*. These soils will be excavated and placed as the finish backfill (approximately 10 feet thick) in the area of agricultural reclamation land use proposed in the northwestern portions of mining Phases 2, 3, and 4 (57 acres total). Additional fine brown silt topsoil encountered in the Phase 5 mining area may be placed in the finish levels of the agricultural reclamation land use proposed in the western portion of mining Phase 4. The re-location of the soils categorized as *Prime Farmland* soils to the agricultural reclamation land use areas in Phases 2, 3, and 4 prevents any net loss of *Prime Farmland* due to mining at the site. Pursuant to California Administrative Code Title 14, Division 2, Chapter 8, Subchapter 1, Article 9, Section 3707, the performance standard for reclamation completion will be that the reclaimed land shall produce approximately 1.7 tons of walnuts per acre or more for two consecutive crop years (average yield of 1997 through 1999 walnut crops as reported by representatives of the Damon Estate). Should the crops grown on the reclaimed land be other than the current walnut crops, the performance standard will be a productivity rate for that crop based on the productivity in the area.

Mining Phase 6 land, also classified as *Prime Farmland*, is planned for reclamation as agricultural land. The Phase 6 land proposed for mining is comprised of approximately 36 acres (Sheet G10). Topsoil salvage, maintenance and redistribution shall be conducted as outlined in section 5.4.1 of this Plan. Pursuant to California Administrative Code Title 14, Division 2, Chapter 8, Subchapter 1, Article 9, Section 3707, the performance standard for reclamation completion will be that the reclaimed land shall produce approximately 3.8 tons of rice per acre or more for two consecutive crop years. Should the crops grown on the reclaimed land be other than the current rice crops, the performance standard will be a productivity rate for that crop based on the productivity in the area.

#### *Non-Prime Farmland*

The Phase 1 - 5 mining area is classified by the NRCD as *Non-Prime Farmland*, with the exception of non-orchard lands comprising of a strip of land as wide as approximately 800 feet between the south side of the Camp Far West Canal and existing orchards which is categorized as "other land". Reclamation in this area of the Project will include the central lake reclamation land use and agricultural reclamation land use. The agricultural backfill areas considered to replace the *Non-Prime Farmland* will be constructed in the western portion of Phases 4 and 5, in the southern portion of Phase 5, in the northeastern portion of the Project, and in the Phase 6 mining area as indicated on Sheet G10. Agricultural backfill will be placed as described in Section 5.4.1 of this Plan. Pursuant to Section 3708, the performance standard for reclamation completion will be that the reclaimed land shall be capable of sustaining economically viable production of crops commonly grown in the surrounding areas.

The agricultural areas north of the Bear River will be developed by the Damon Estate following replacement of growth media by Patterson Sand & Gravel. Proposed agricultural lands south of the Bear River will be developed by Patterson Sand & Gravel or an agent of Patterson.

#### 6.6.6 Elderberry Mitigation Areas

Biological studies have identified the presence of a large number of elderberry shrubs on the project site. These are habitat for the Federally listed ("threatened") species, the valley elderberry longhorn beetle (VELB). There are over 400 shrubs in the study area, including 225 shrubs in the proposed oak preserve areas. Additional shrubs are located within the Bear River Preservation Corridor. An elderberry mitigation plan is being prepared (separate from this Reclamation Plan) in coordination with and for approval by the U.S. Fish and Wildlife Service (FWS). The FWS will oversee elderberry mitigation work which will include the transplantation of elderberry shrubs that would be impacted by mining activities and the planting of over 1,000 additional elderberry seedlings mixed with plantings of other native species. Approximately 15 acres will be necessary for these plantings which will be included in the 112 acres of oak woodland/riparian habitat to be created in the mined areas. This mitigation will include monitoring of the VELB population and the condition of the elderberry and associated native plantings, and maintaining a survival rate of not less than 60 percent for the duration of a 15-17 year monitoring period. The elderberry monitoring will be conducted along with other revegetation monitoring at the site as previously described in section 6.6.4 of this Plan.

#### 6.7 Future Mining

Reclamation to the proposed end uses as watershed/wildlife habitat and agricultural use

including possible walnut orchards and rice fields will not preclude the possibility of, or affect the potential for future mining at the site.

#### 6.8 Administrative Requirements

Reclamation performance standards set forth in California Administrative Code Title 14, Division 2, Chapter 8, Subchapter 1, Article 9 regarding wildlife habitat; backfilling; revegetation; drainage, diversion structures, waterways, and erosion control; agricultural land reclamation; building, structure, and equipment removal; stream protection; and topsoil salvage; shall be adhered to.

#### 6.9 Financial Assurances

The owners of the Patterson Sand & Gravel operation accept responsibility for reclaiming the lands disturbed by the mining project after January 1, 1976 and will provide financial assurance to ensure performance for reclamation in accordance with the requirements in SMARA. Calculations of unit activities necessary to reclaim the mined site in accordance with standards acceptable to the governing agencies, and consistent with the intent of the proposed end uses, are included in Appendix A. The proposed reclamation activities and end uses for the project at its current stage of development and as of the date of preparation of this Plan include:

- Re-contouring existing mine slopes to maximum 2.25:1 slopes,
- Natural rainfall and groundwater filling of excavation areas to form a central lake (89 ac.±),
- Spreading of growth medium (re-contoured slopes, 25 ac.±),
- Erosion control re-vegetation (125 ac.±),
- Application of erosion control Best Management Practices,
- Re-planting trees and woody shrubs on slopes (25 ac.±) and
- Processing plant decommissioning.

Assurances calculations have been based on reclamation of the lands disturbed at the time of the preparation of this Plan and disturbed areas projected for the next year. A yearly analysis of the calculated assurances is to be conducted at the time of required annual mine inspections. Any needed amendments to the calculations and Financial Assurances will be made following the yearly analyses.

Mining on a portion of the Damon Estate property near the northeastern border of the mining area (indicated on Sheet G3) has been completed and the agricultural development plan for the project includes replacement of the excavated material with slurried silty sand/growth media from the wash plant, and subsequent planting with walnut trees to enlarge the adjacent orchard. However, the financial assurances calculations presented here do not consider the costs for orchard planting in this or other areas designated for future agricultural development, but take into account the costs for conducting standard erosion control measures and revegetation as proposed for the other lands of the project currently disturbed by mining.

Plant equipment and structure removal costs are considered to be offset by the surplus/salvage value of the plant structures and equipment



## 7.0 CERTIFICATIONS

### 7.1 Lead Agency Certification

I, the undersigned, hereby certify that this reclamation plan complies with the applicable requirements of Articles 1 and 9 (commencing with Sections 3500 et seq. and 3700 et seq., respectively) of Chapter 8 of Division 2 of Title 14 of the California Code of Regulations, and with the requirements of the Surface Mining and Reclamation Act, Sections 2710 et seq., and as summarized in California Department of Conservation, Office of Mine Reclamation Document, including 1997 statutes.

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 200\_\_

Planning Director \_\_\_\_\_

### 7.2 Statement of Responsibilities

I, the undersigned, hereby agree to accept full responsibility for reclamation of all mined lands as described and submitted herein and in conformance with the applicable requirements of Articles 1 and 9 (commencing with Sections 3500 et seq. and 3700 et seq., respectively) of Chapter 8 of Division 2 of Title 14 of the California Code of Regulations, the Surface Mining and Reclamation Act commencing with Section 2710 et seq. of Chapter 9 of Division 2 of the Public Resources Code, and with any modifications requested by the administering agency as conditions of approval.

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 200\_\_

Mine Operator or Operator's Agent \_\_\_\_\_

## 8.0 REFERENCES

Clark, L.D., 1960, "Foothills Fault System, Western Sierra Nevada, California" Geological Society of America, Bulletin, v. 71.

Glazner, Jeff, 1996 Biological Resources Report for the Patterson Sand & Gravel/Damon Orchard Expansion Area, unpublished report.

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Jennings, C.W. 1994. *Fault Activity Map of California and Adjacent Areas*: California Geologic Data Map Series, Map No. 6, (1:750,000). Sacramento, California: California Department of Conservation, Division of Mines and Geology.

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Rogers, John H., 1980, Soil Survey of Placer County, California, Western Part, Sheet No. 3, Wolf Quadrangle and Part of Camp Far West Quadrangle, United States Department of Agriculture Publication, map scale 1:24,000.

USDA Soil Conservation Service, Yuba County Soil Survey, Camp Far West Quadrangle, United States Department of Agriculture Publication, map scale 1:24,000.

United States Geological Survey, Camp Far West 7.5 Minute Quadrangle, 1995 Provisional Edition, scale 1:24,000.

Woodward-Clyde Consultants, 1977, "Earthquake Evaluation studies of the Auburn Dam Area", Report by Woodward Clyde Consultants to U.S. Bureau of Reclamation.

**Appendix A**

Geotechnical Notes and Details (Sheet G1)  
Existing Mine Conditions (Sheet G2)  
Mine Phasing Plans (Sheets G3 - G8)  
Phase 4 Drainage Channel (Sheet G9)  
Final Grading Plan/Reclamation Plan (Sheet G10)  
Cross Sections (Sheet G11)  
Exploratory Boring Logs (Sheet G12)  
CEI Memorandum/Report - Mining Cut Slopes - Phases 2 thru 4  
Financial Assurances Calculations

# PATTERSON SAND & GRAVEL

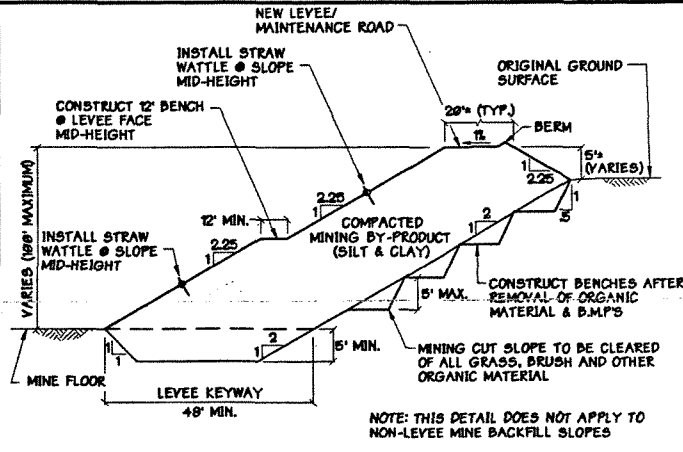
8705 Camp Far West Road  
Sheridan, California



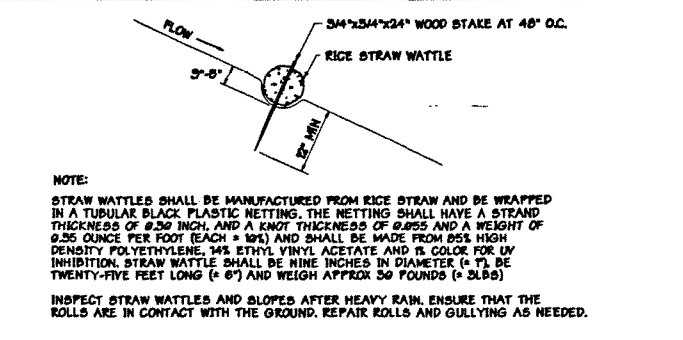
## Mine Reclamation Plan

### General Notes

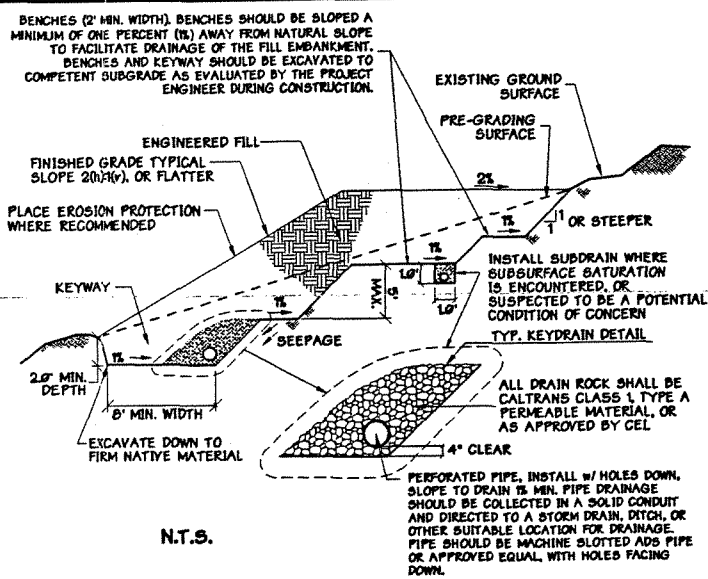
1. ALL REFERENCES TO "STANDARD SPECIFICATIONS" SHALL MEAN THE STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTATION (CALTRANS) STANDARD SPECIFICATIONS, JULY, 1982. CONSTRUCTION NOT SPECIFIED ON THESE PLANS OR SPECIFIC PLACER COUNTY ORDINANCES SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS. THE OWNER IS OBLIGATED TO FAMILIARIZE HIMSELF WITH APPLICABLE SPECIFICATIONS NOT DISCUSSED IN THE GENERAL NOTES.
2. CLEARING AND GRUBBING SHALL CONFORM TO THE PROVISIONS OF SECTION 16 OF THE STANDARD SPECIFICATIONS.
3. ALL EXCAVATION, EMBANKMENT, AND BACKFILL SHALL CONFORM TO THE PROVISIONS IN SECTION 16, "EARTHWORK," OR THE STANDARD SPECIFICATIONS.
4. ALL GRADING SHALL CONFORM TO THE PLACER COUNTY GRADING, EROSION AND SEDIMENT CONTROL ORDINANCE.
5. ALL WORK SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THE PLACER COUNTY DESIGN AND IMPROVEMENTS STANDARDS MANUAL AND TO THE SATISFACTION OF THE DIRECTOR OF THE DEPARTMENT OF TRANSPORTATION.
6. COMPACTION TESTS SHALL BE TAKEN AT A MAXIMUM OF TWO (2) FOOT LIFTS AND IN CONFORMANCE WITH THE PLACER COUNTY GRADING ORDINANCE. TESTS SHALL BE AT THE DISCRETION OF THE DEPARTMENT OF TRANSPORTATION INSPECTOR. COSTS FOR TESTING SHALL BE THE RESPONSIBILITY OF THE OWNER.
7. STRUCTURAL FILLS FOR LEVEE CONSTRUCTION SHALL BE MOISTURE CONDITIONED TO A UNIFORM MOISTURE CONDITION AT LEAST 2 PERCENT ABOVE OPTIMUM MOISTURE CONTENT AND COMPACTED TO A MINIMUM OF 90% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY THE ASTM 1557-81 TEST PROCEDURE.
8. VEGETATION SHALL BE ESTABLISHED ON ALL RECLAIMED AREAS INCLUDING CUTS AND FILL IMMEDIATELY AFTER COMPLETION OF MINING TO CONTROL EROSION. REVEGETATION SHALL BE 15 LBS/ACRE BLANDO BROOME, 12 LBS/ACRE ROSE CLOVER 16-28-00 FERTILIZER AT 500 LBS/ACRE AND STRAW MULCH (TUCKED) AT 4000 LBS/ACRE. STRAW MULCH TO BE APPLIED TO A UNIFORM DEPTH OF 2-3 INCHES SO THAT 80%-100% OF THE SURFACE IS COVERED, OR EQUIVALENT AS APPROVED BY THE RESOURCE CONSERVATION DISTRICT.
9. THE OWNER SHALL BE RESPONSIBLE FOR IMPLEMENTING ALL TEMPORARY EROSION CONTROL MEASURES WHICH HAVE BEEN INCORPORATED INTO THIS RECLAMATION PLAN. ALL SUCH MEASURES SHALL CONFORM TO THE PLACER COUNTY GRADING, EROSION AND SEDIMENT CONTROL ORDINANCE TO ENSURE THAT SEDIMENT LADEN RUNOFF DOES NOT LEAVE THE PROJECT SITE. THE OWNER SHALL BE RESPONSIBLE FOR THE MAINTENANCE AND PERFORMANCE OF THE TEMPORARY EROSION CONTROL MEASURES THROUGH THE DURATION OF THE PROJECT.
10. PERIODIC INSPECTION AND REPAIR WILL BE REQUIRED BY THE OWNER TO KEEP DRAINAGE IMPROVEMENTS OPERABLE. REMOVAL OF SEDIMENT DEPOSITS AND VEGETATIVE MATERIALS IN PIPES, INLET STRUCTURES AND DRAINAGE INVERTS SHALL BE PERFORMED AT A REGULAR MAINTENANCE INTERVAL TO PREVENT ACCUMULATION AND OBSTRUCTION OF DRAINAGE IMPROVEMENT OPERATION.
11. THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITIES, PIPES AND/OR STRUCTURES SHOWN ON THIS PLAN WERE OBTAINED BY A SEARCH OF AVAILABLE RECORDS. THE OWNER SHALL ASCERTAIN THE TRUE LOCATION OF ANY UNDERGROUND UTILITIES AND SHALL BE RESPONSIBLE FOR ANY AND ALL DAMAGE TO ANY AND ALL PUBLIC OR PRIVATE UTILITIES, SHOWN OR NOT SHOWN HEREON.



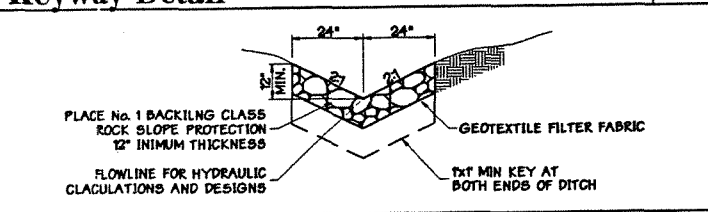
Levee Construction Detail NTS 3



Straw Wattle Detail NTS 4



Keyway Detail NTS 6

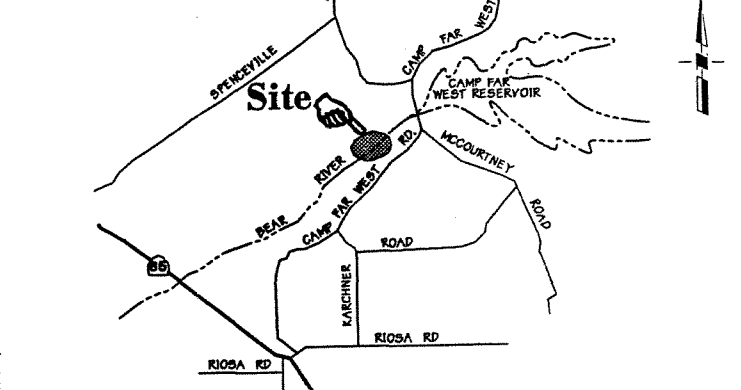


Rock Lined Ditch Detail NTS 7

### Sheet Index

- G1 MINE RECLAMATION NOTES & DETAILS
- G2 EXISTING MINE CONDITIONS
- G3 MINE PHASING PLAN - PHASE 1
- G4 MINE PHASING PLAN - PHASE 2
- G5 MINE PHASING PLAN - PHASE 3
- G6 MINE PHASING PLAN - PHASE 4
- G7 MINE PHASING PLAN - PHASE 5
- G8 MINE PHASING PLAN - PHASE 6
- G9 PHASE 4 DRAINAGE CHANNEL DETAIL & SECTION PLAN
- G10 FINAL GRADING/MINE RECLAMATION PLAN
- G11 CROSS SECTIONS
- G12 EXPLORATORY BORING LOGS

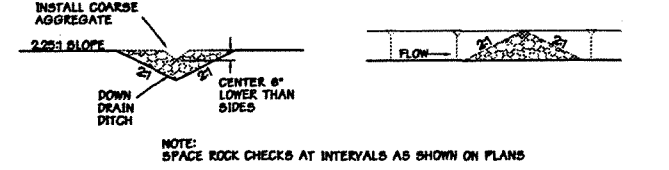
### Vicinity Map



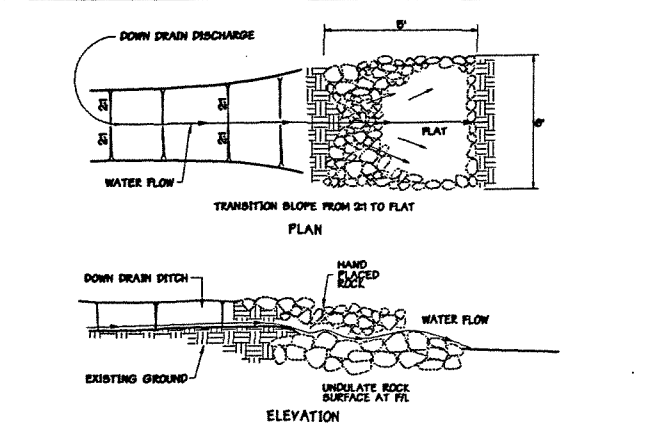
### Borelog Explanation

SYMBOLS		PLASTICITY INDEX		
	WATER LEVEL AT TIME OF DRILLING			
	WATER LEVEL AFTER DRILLING			
	BULK, BAG, OR GRAB SAMPLE			
	SHELBY TUBE (3" OUTSIDE DIAMETER)			
	SPLIT SPOON SAMPLER (2" O.D.)			
	MODIFIED CALIFORNIA SAMPLER (2.5" O.D.)			
	CALIFORNIA SAMPLER (3" O.D.)	LIQUID LIMIT		
SOIL CLASSIFICATION				
COARSE GRAINED SOILS #200 PASS #1000 SEIVE	GRAVELS #200 PASS #100 SEIVE		GW	WELL GRADED GRAVEL, GRAVEL/SAND MIXES
			GP	POORLY GRADED GRAVEL, GRAVEL/SAND MIXES
	SANDS #200 PASS #100 SEIVE		GM	SILTY GRAVEL, POORLY GRADED GRAVEL/SAND/SILT MIXES
			GC	CLAYEY GRAVELS, POORLY GRADED GRAVEL/SAND/CLAY MIXES
SANDS #200 PASS #100 SEIVE		SW	WELL GRADED SAND, GRAVELLY SAND	
		SP	POORLY GRADED SAND, GRAVELLEY SAND	
FINE GRAINED SOILS #200 PASS #400 SEIVE	SILTS & CLAYS LIQUID LIMIT < 50		SM	SILTY SAND, POORLY GRADED SAND, SAND/GRAVEL/SILT MIXES
			SC	CLAYEY SAND, POORLY GRADED SAND/GRAVEL/CLAY MIXES
	SILTS & CLAYS LIQUID LIMIT > 50		ML	INORGANIC SILTS AND VERY FINE SANDS, SILTY OR CLAYEY FINE SAND/CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY SANDS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
HIGHLY ORGANIC SOILS	SILTS & CLAYS LIQUID LIMIT > 50		OL	ORGANIC CLAYS AND SILTS OF LOW PLASTICITY
			MH	INORGANIC SILTS, MICAEOUS OR DIATOMACEOUS FINE SAND OR SILT
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC SILTS AND CLAYS OF MEDIUM TO HIGH PLASTICITY
			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENT

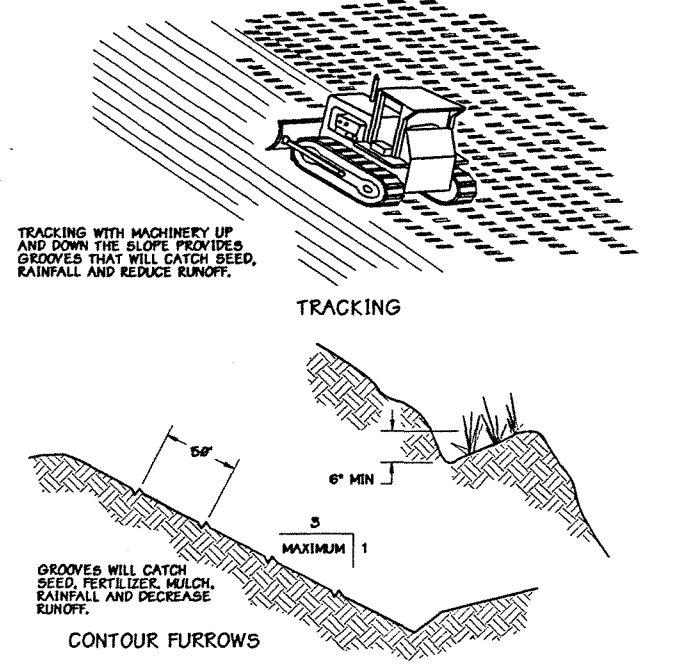
### Rock Check Detail



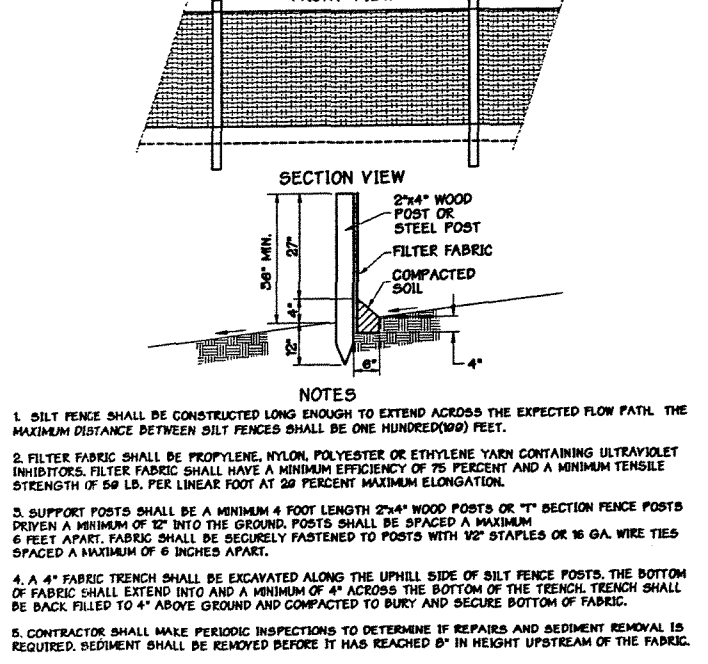
Rock Check Detail NTS 1



Energy Dissipator NTS 2



Surface Roughening Detail NTS 5

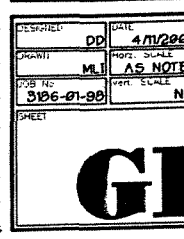


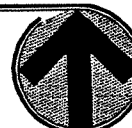
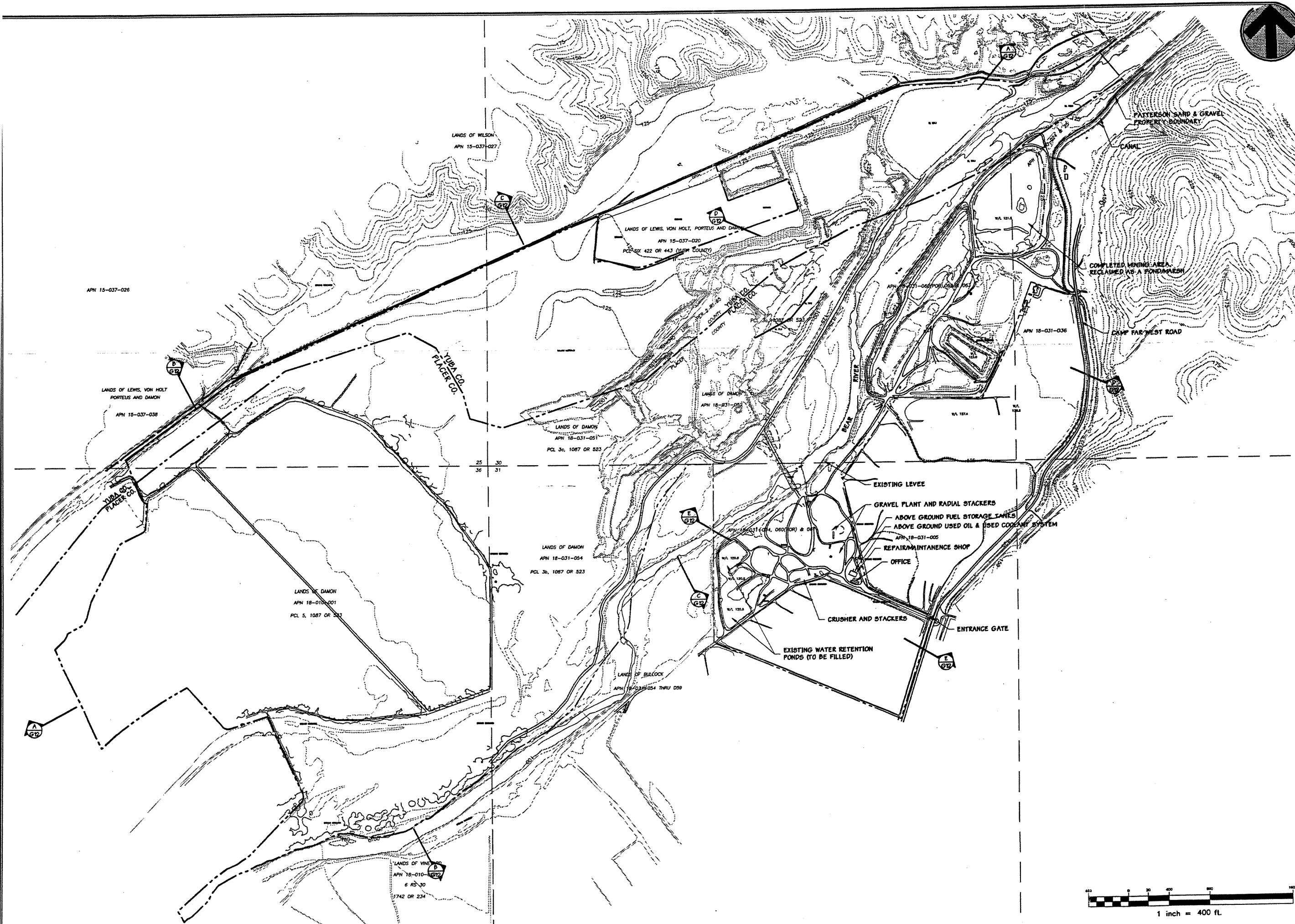
Silt Fence Detail NTS 8

PATTERSON SAND & GRAVEL  
MINE RECLAMATION NOTES  
AND DETAILS

Project Location:  
Patterson Sand & Gravel  
8705 Camp Far West Road  
Sheridan, California

Ownership Information:  
Patterson Sand & Gravel  
P.O. Box 12  
Sheridan, California 95881





**CARLTON**  
Engineering Inc.  
1817 Frederick Road, Shingle Springs, CA 95682  
Voice 530.877.5515 Fax 530.877.8845

**SCHEMATIC**  
NOT FOR CONSTRUCTION

Revisions	DATE	DESCRIPTION
	BY	DATE

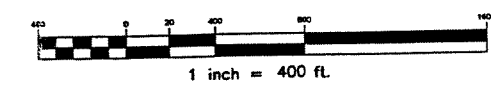
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**EXISTING MINE CONDITIONS**

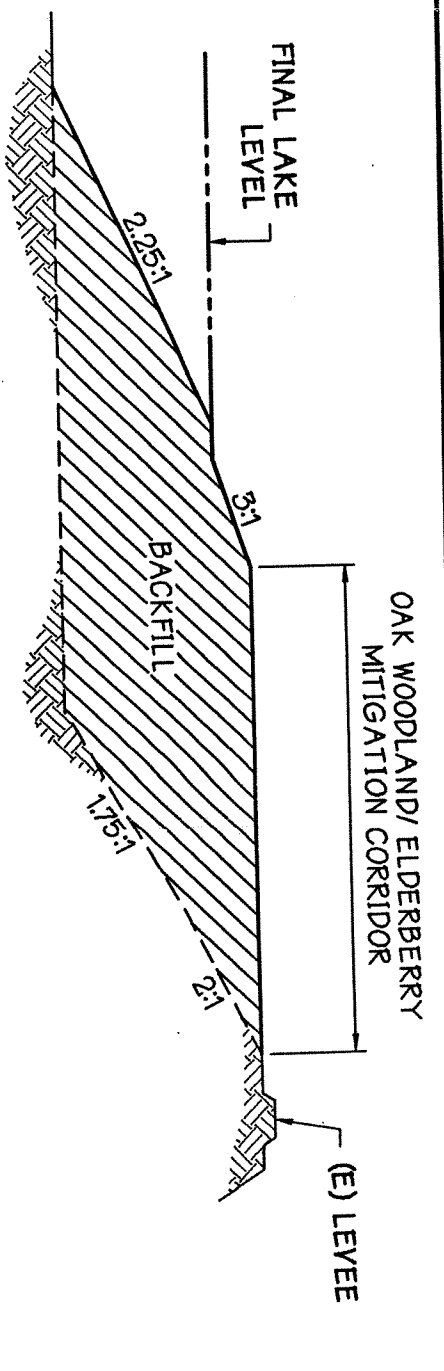
**Project Location:**  
Patterson Sand & Gravel  
8705 Camp Far West Road  
Sheridan, California

**Ownership Information:**  
Patterson Sand & Gravel  
P.O. Box 12  
Sheridan, California 95681

DESIGNED	M/D	DATE	6/1/2003
DRAWN	M/I	HORIZ. SCALE	1"=400'
CHECKED	3/26-01-03	VERT. SCALE	N/A
SHEET			

**G2**



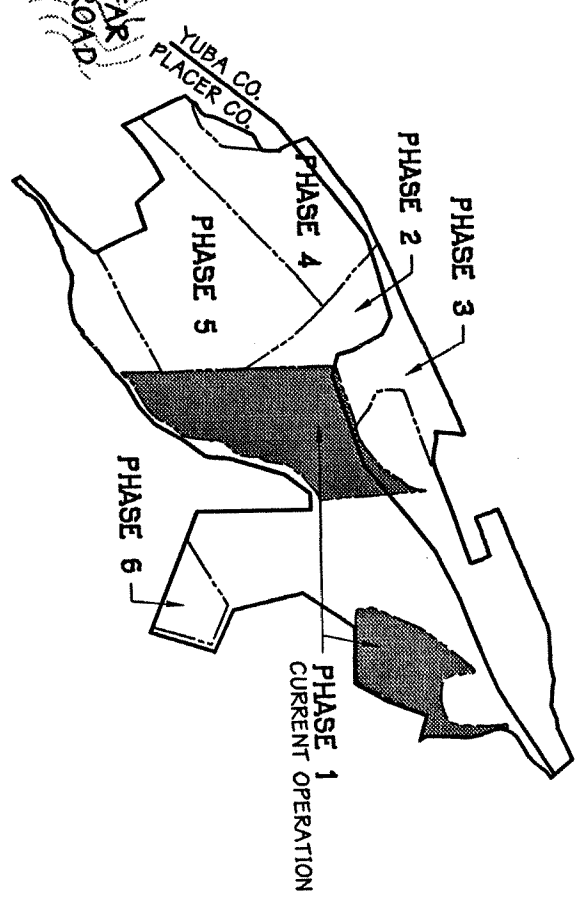


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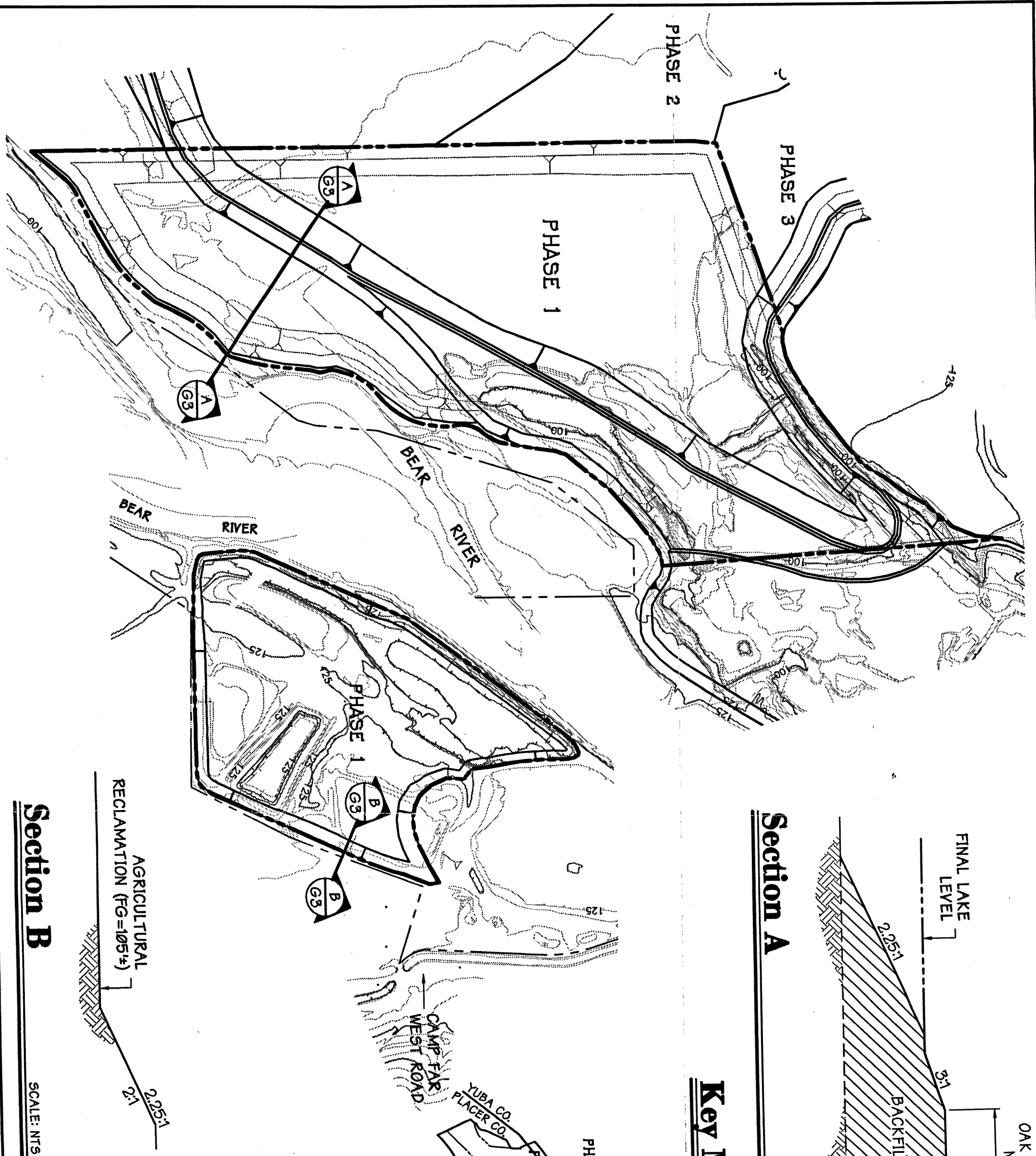
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SCALE: 1"=3000'

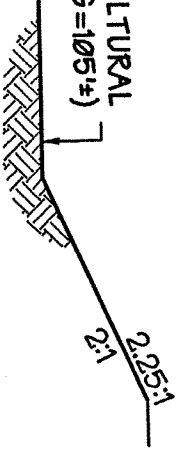


**Legend**

- MINE PHASE LINE
- PATTERSON SITE BOUNDARY
- MINING SLOPES
- BACKFILL SLOPES

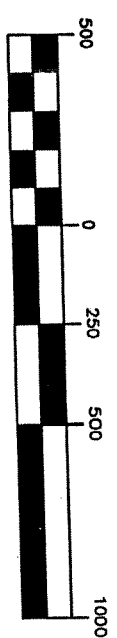


AGRICULTURAL RECLAMATION (FG=105<sup>±</sup>)



**Section B**

SCALE: NTS



1 inch = 500 ft.

**Project Location:**  
8705 CAMP FAR  
WEST RD. SHERIDAN  
CALIFORNIA 95681

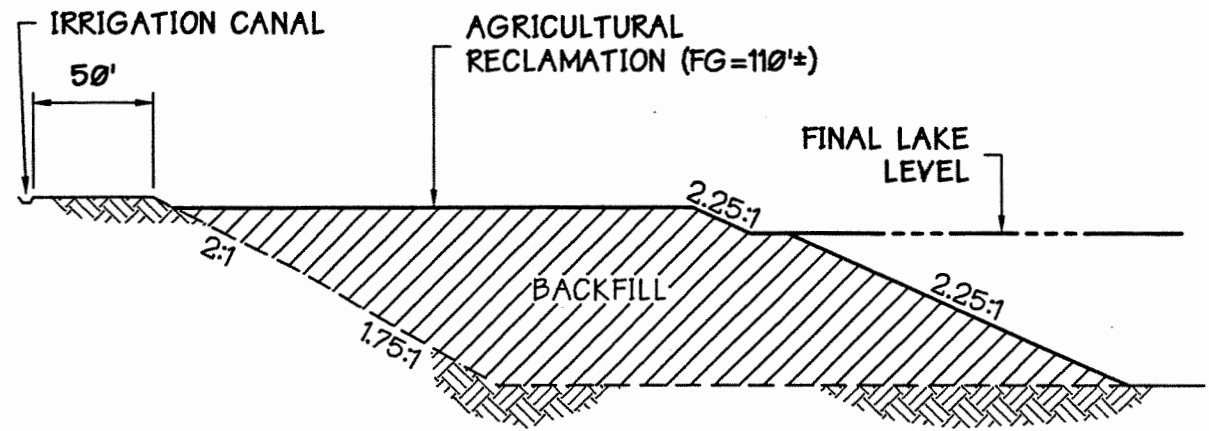
**PATTERSON SAND & GRAVEL**  
**MINE PHASING PLAN**  
**PHASE 1**

**CARLTON**  
Engineering Inc.

3932 Ponderosa Road, Shingle Springs, CA 95682  
Voice 530.677.5515 Fax 530.677.6645

PROJECT NO. M.D. 11/12/2003  
DRAWN BY M.L. 11/12/2003  
CHECKED BY J.S. 11/12/2003  
SCALE 1"=500'  
SHEET 306-01-90 N/A



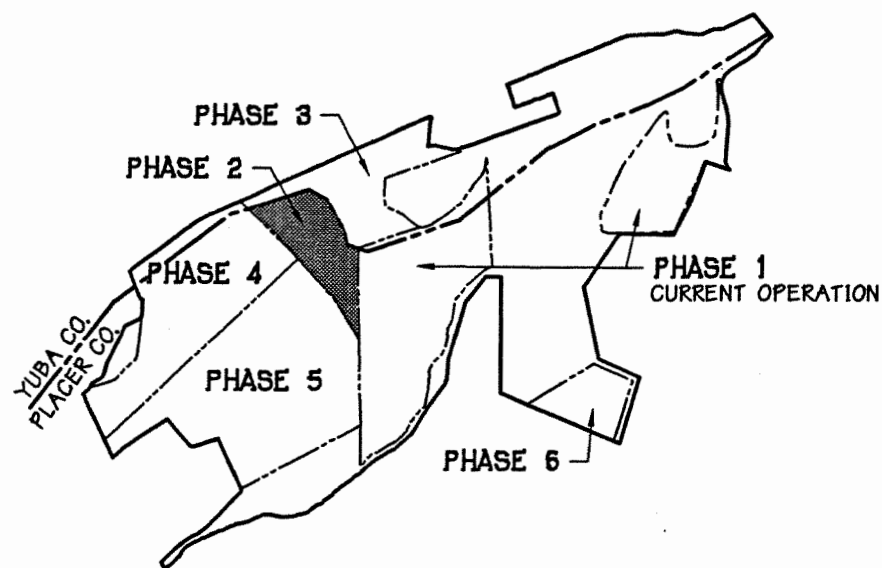


**Section A**

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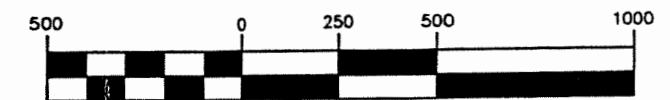
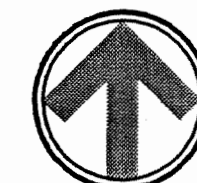
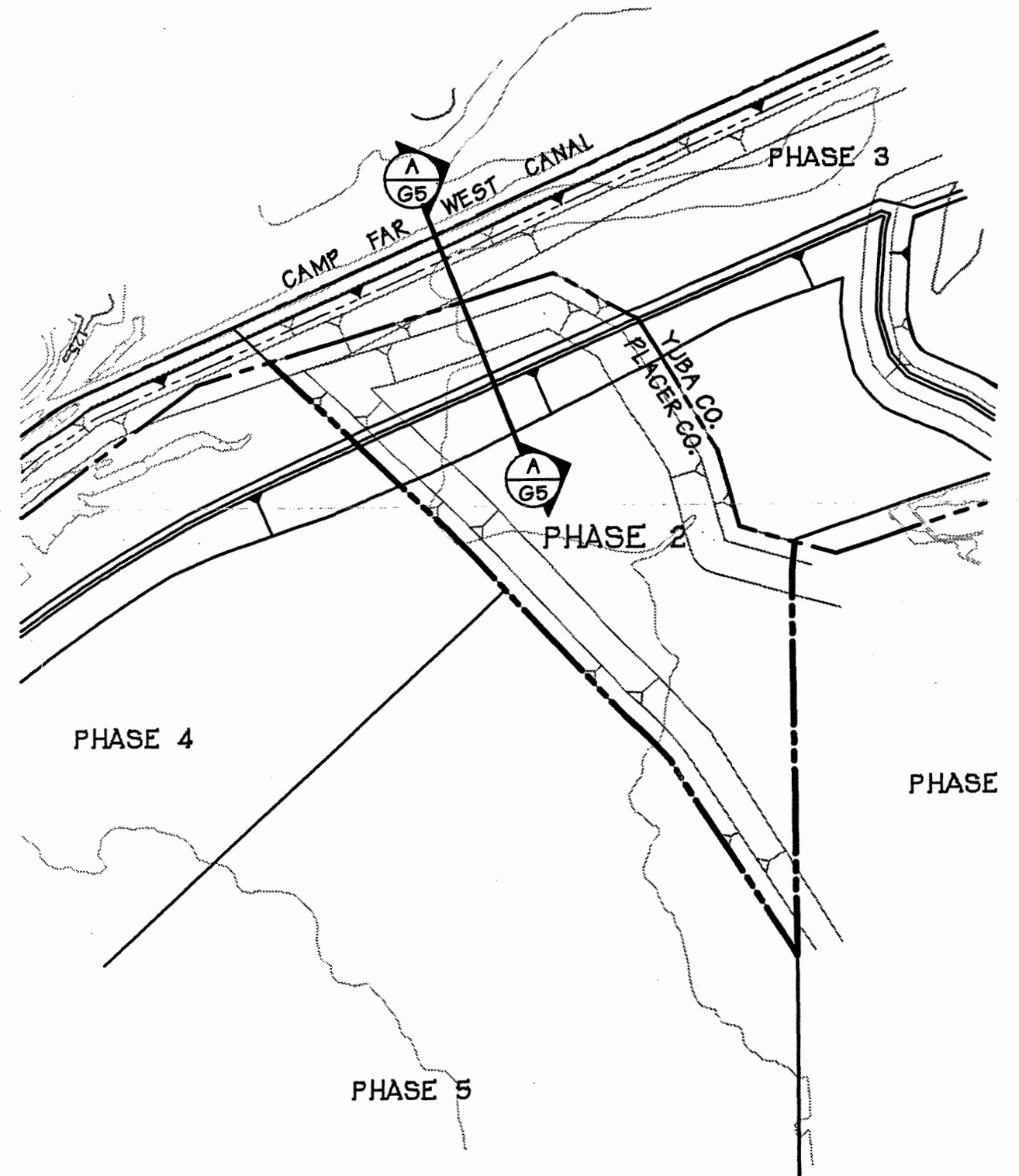
**Key Map**

SCALE: 1"=3000'



**Legend**

- MINE PHASE LINE
- PATTERSON SITE BOUNDARY
- MINING SLOPES
- BACKFILL SLOPES



1 inch = 500 ft.



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**PATTERSON SAND & GRAVEL**

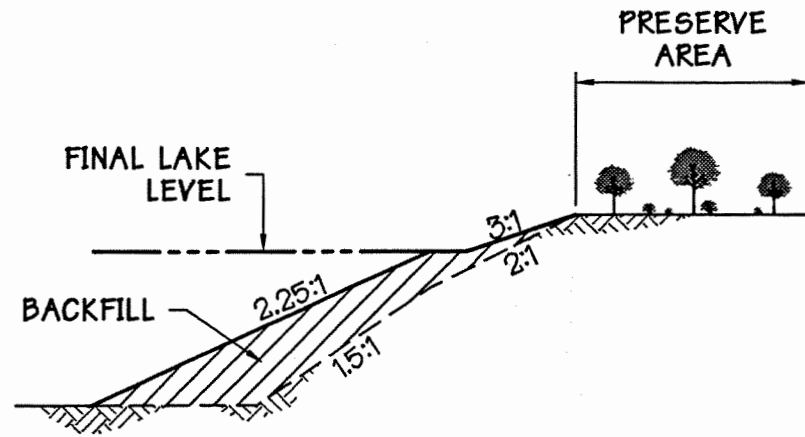
**MINE PHASING PLAN  
PHASE 2**

**Project Location:**

8705 CAMP FAR  
WEST RD. SHERIDAN  
CALIFORNIA 95681

DESIGNED	MVD	DATE	4/11/2003
DRAWN	ML	SCALE	1"=500'
CHECKED	5/06-01-90	APP. SCALE	N/A

**G4**

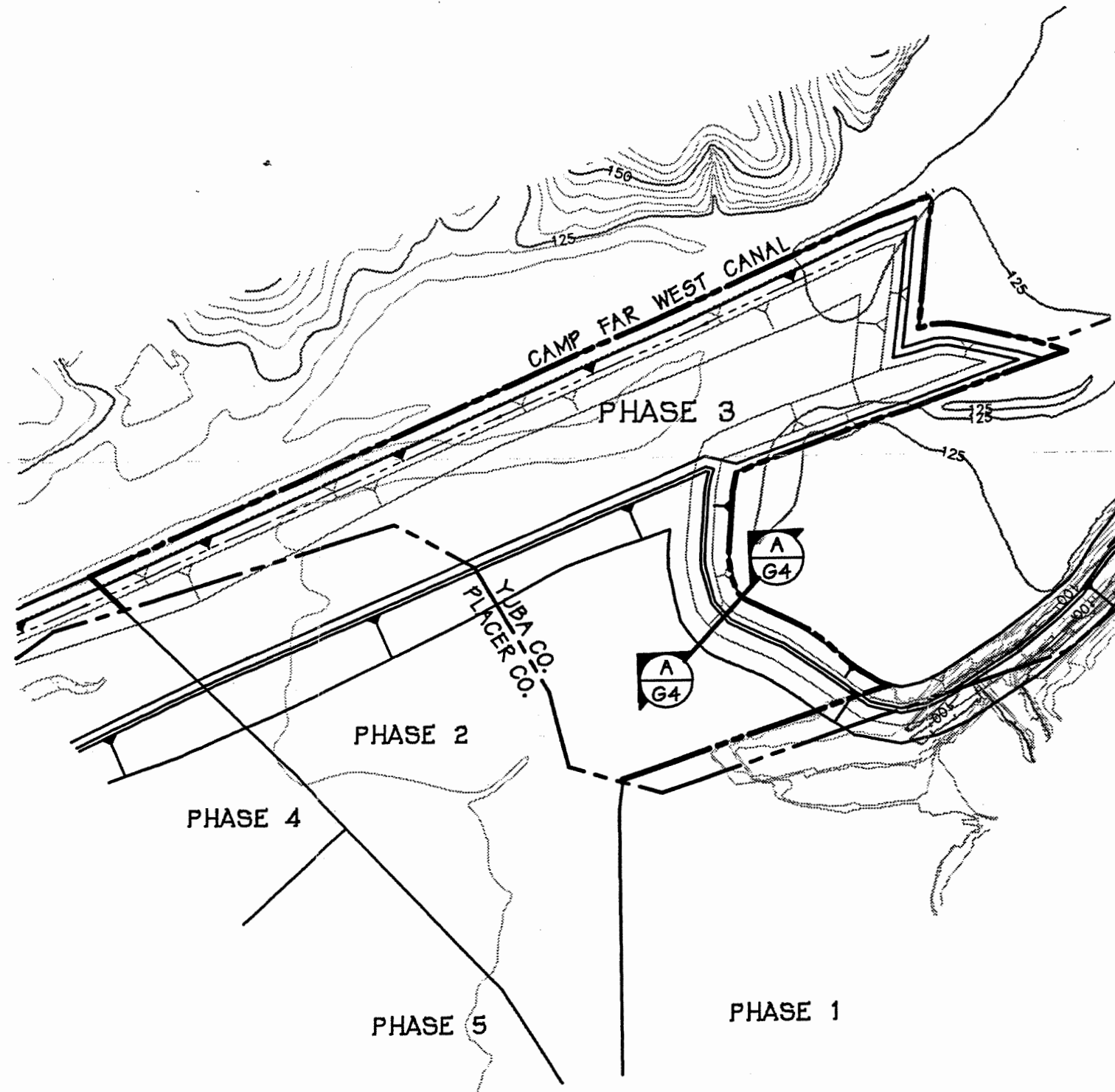
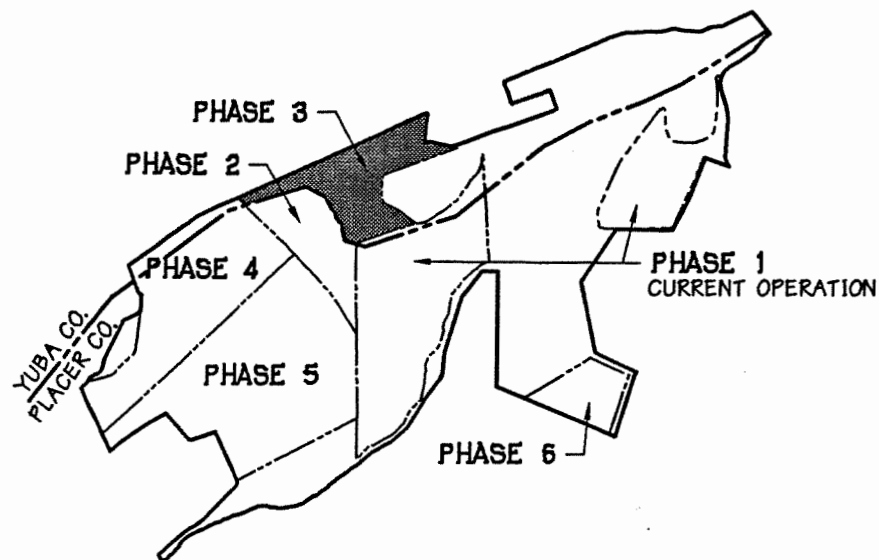


## Section A

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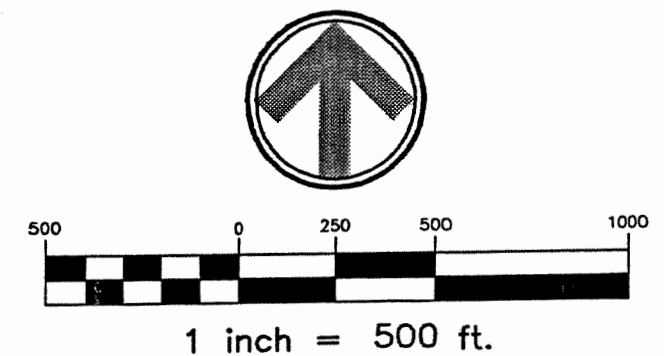
## Key Map

SCALE: 1"=3000'



## Legend

- MINE PHASE LINE
- PATTERSON SITE BOUNDARY
- MINING SLOPES
- BACKFILL SLOPES



**CARLTON**  
Engineering Inc.

3932 Ponderosa Road, Shingle Springs, CA 95682  
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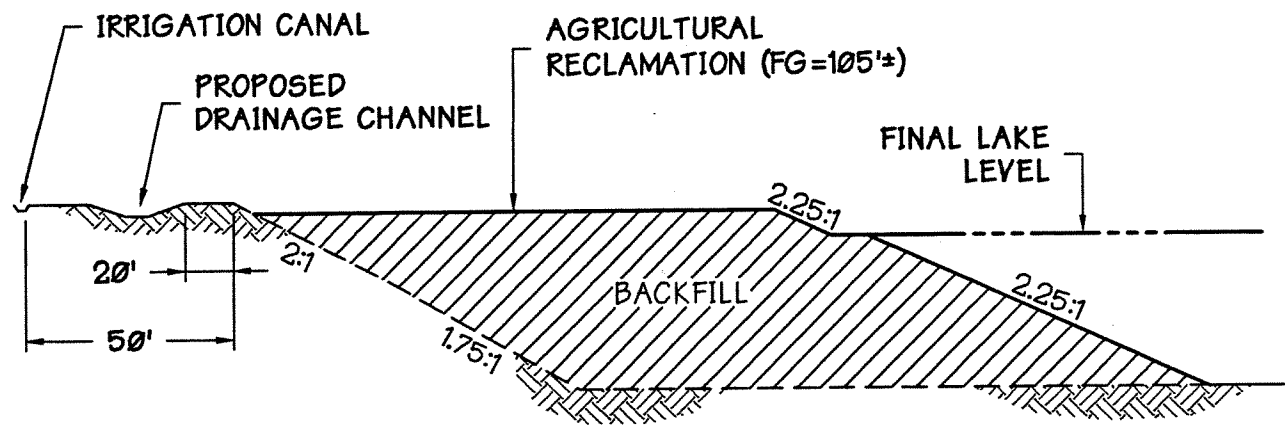
**PATTERSON SAND & GRAVEL**  
**MINE PHASING PLAN**  
**PHASE 3**

**Project Location:**  
8705 CAMP FAR  
WEST RD. SHERIDAN  
CALIFORNIA 95681

DESIGNED: MYP DATE: 4/11/2003  
DRAWN: MLJ  
CHECKED: T-5000  
DATE: 3/26/01-98  
SHEET: N/A

**G5**



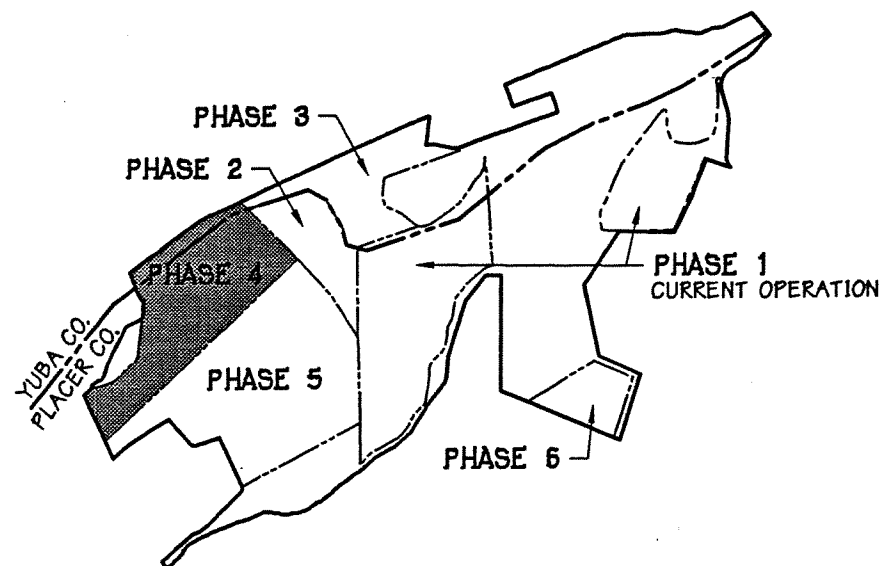


## Section A

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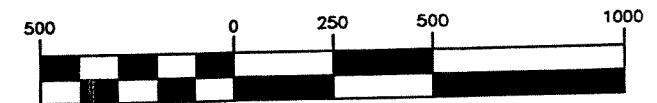
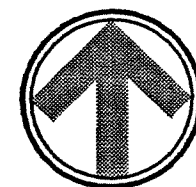
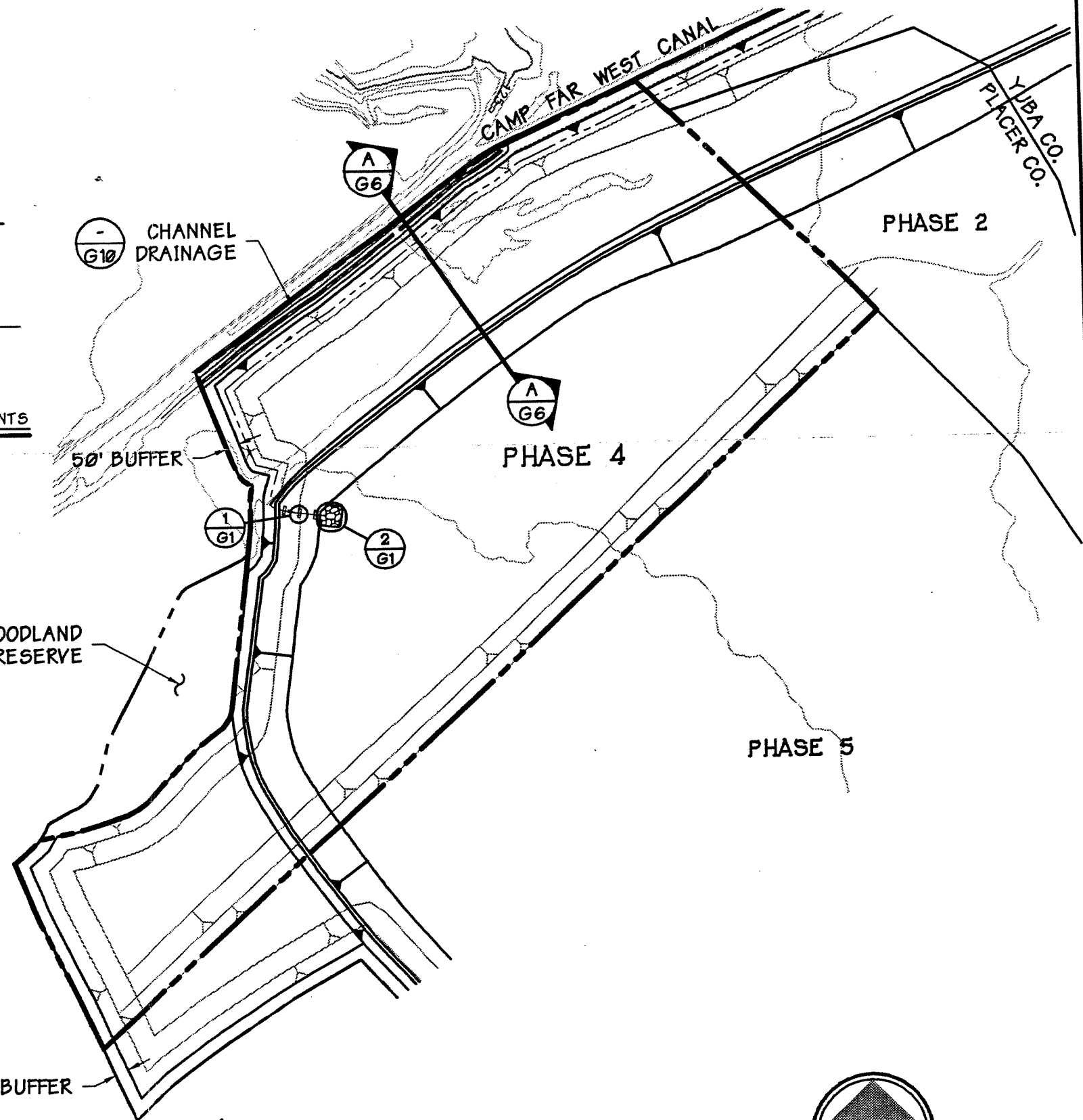
## Key Map

SCALE: 1"=3000'

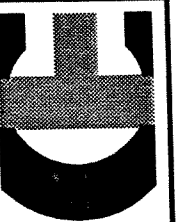


## Legend

- MINE PHASE LINE
- PATTERSON SITE BOUNDARY
- MINING SLOPES
- BACKFILL SLOPES



1 inch = 500 ft.

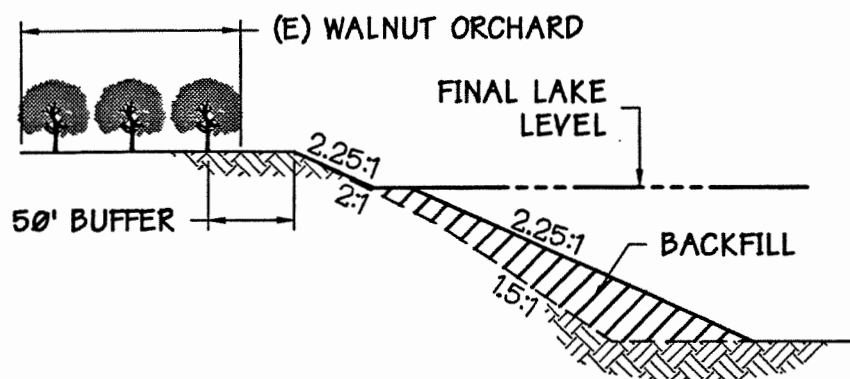


**CARLTON**  
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3932 Ponderosa Road, Shingle Springs, CA 95882  
Voice 530.677.5515 Fax 530.677.6645

**PATTERSON SAND & GRAVEL**  
**MINE PHASING PLAN**  
**PHASE 4**

**Project Location:**  
8705 CAMP FAR  
WEST RD. SHERIDAN  
CALIFORNIA 95681

DESIGNED: MVD DATE: 4/1/2003  
DRAWN: MLI REV: 500'  
3026-01-98 REV: N/A  
**G6**

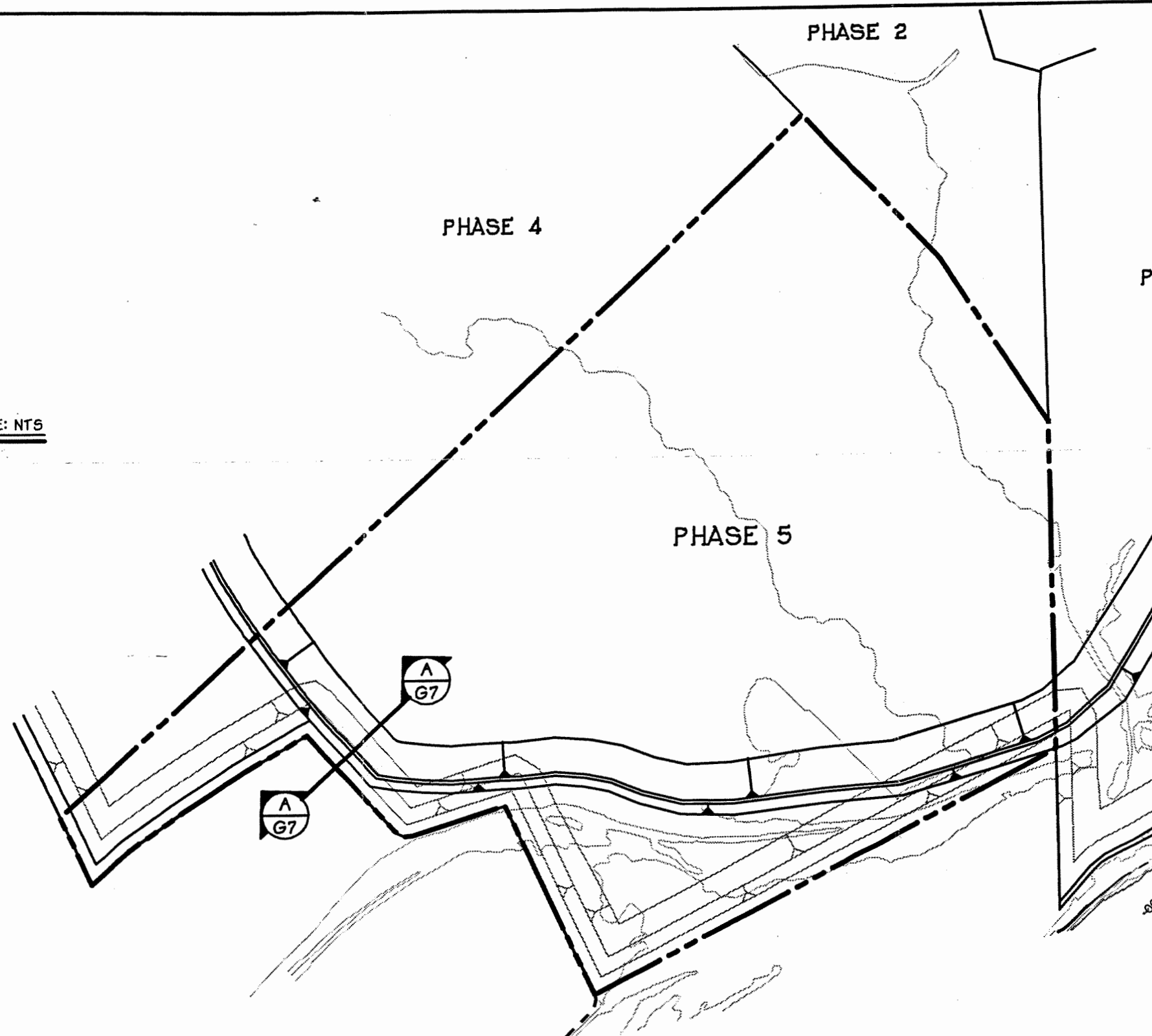
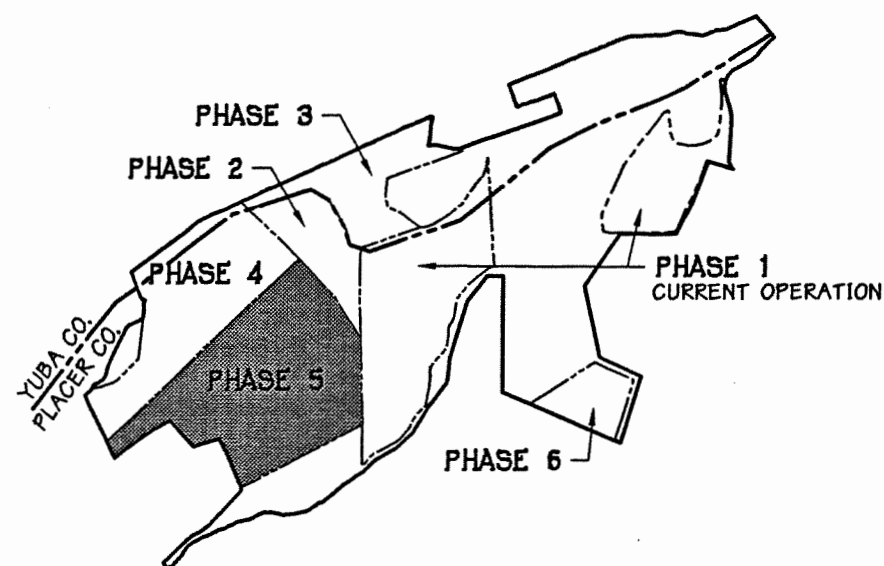


## Section A

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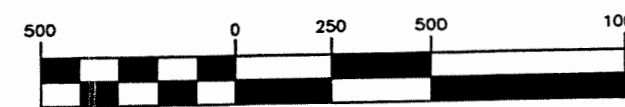
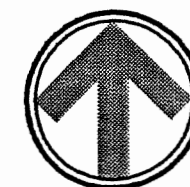
## Key Map

SCALE: 1"=3000'



## Legend

- MINE PHASE LINE
- PATTERSON SITE BOUNDARY
- Y MINING SLOPES
- Y BACKFILL SLOPES



1 inch = 500 ft.



**CARLTON**  
Engineering Inc.

3932 Ponderosa Road, Shingle Springs, CA 95682  
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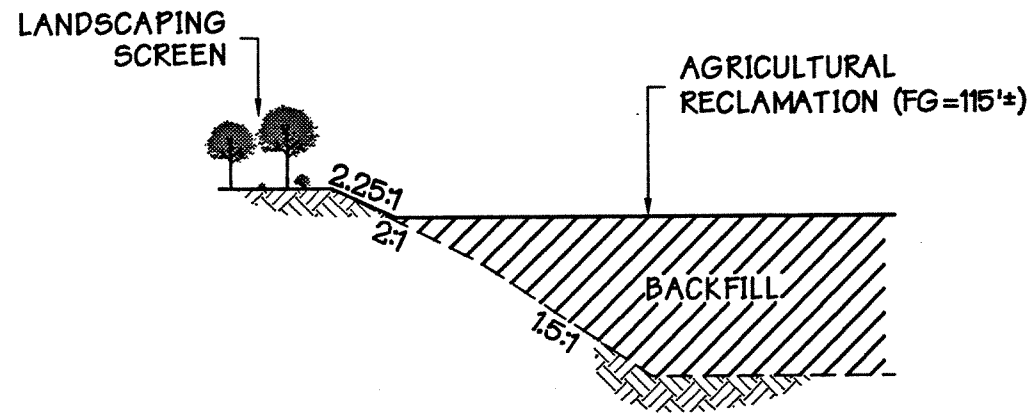
**PATTERSON SAND & GRAVEL**

**MINE PHASING PLAN  
PHASE 5**

**Project Location:**

8705 CAMP FAR  
WEST RD. SHERIDAN  
CALIFORNIA 95681

DESIGNED	MYD	DATE	4/1/2003
DRAWN	MLI	SCALE	1"=500'
CHECKED	3/16/01-98	REV. SCALE	N/A
<b>G7</b>			

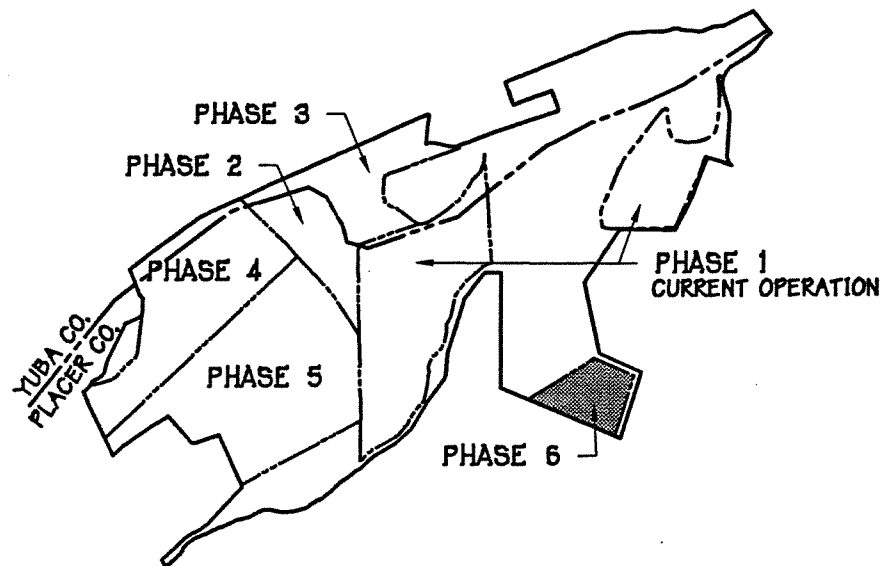


## Section A

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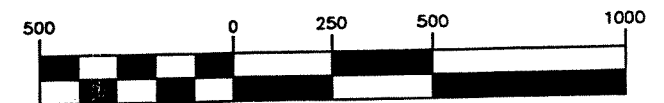
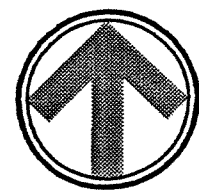
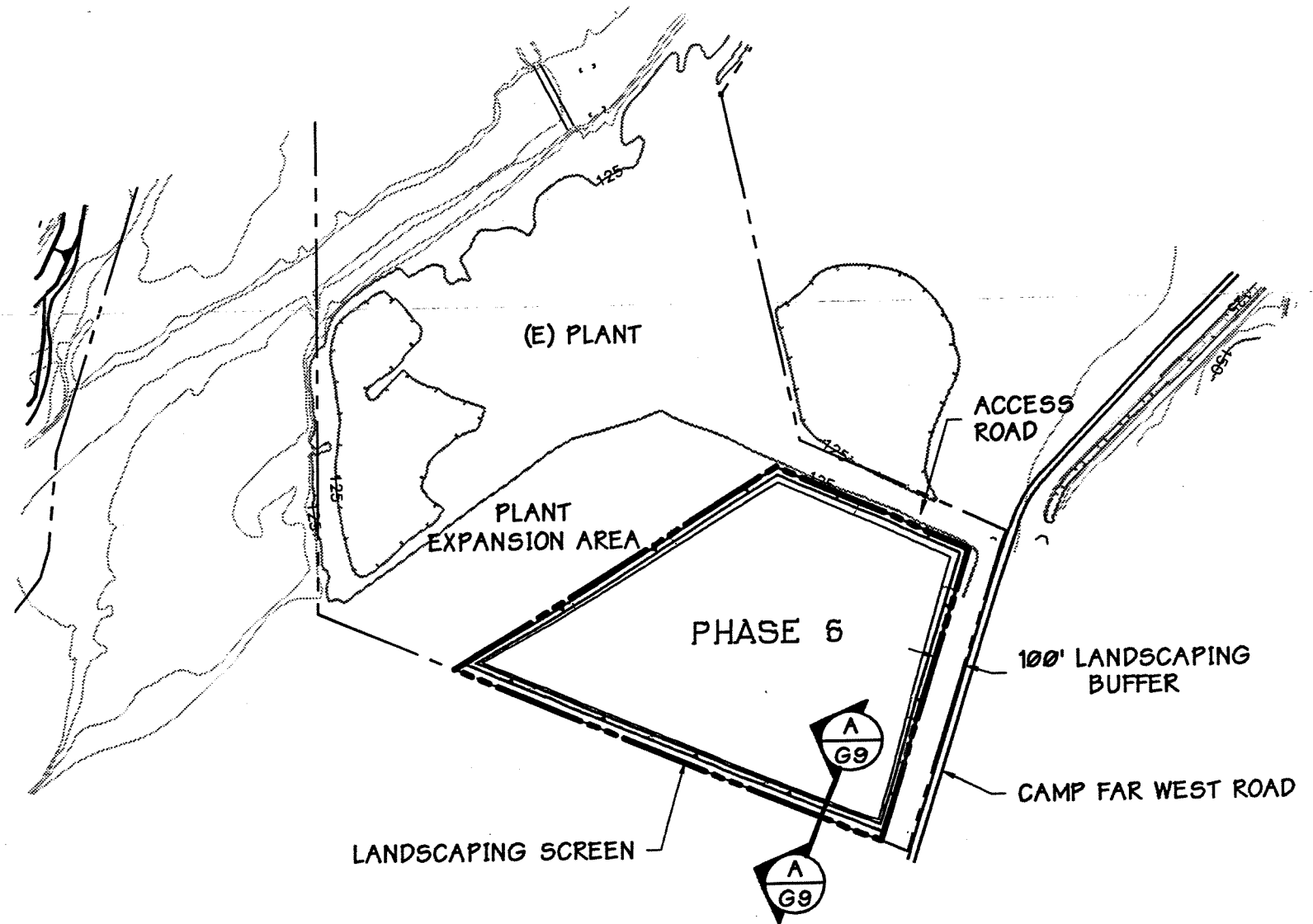
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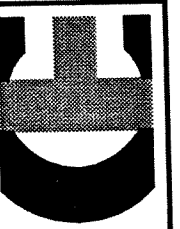


## Legend

- MINE PHASE LINE
- - - PATTERSON SITE BOUNDARY
- MINING SLOPES
- BACKFILL SLOPES



1 inch = 500 ft.



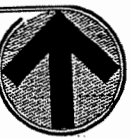
**CARLTON**  
Engineering Inc.  
3932 Ponderosa Road, Shingle Springs, CA 95682  
Voice 530.677.5515 Fax 530.677.6645

**PATTERSON SAND & GRAVEL**  
**MINE PHASING PLAN**  
**PHASE 6**

**Project Location:**  
8705 CAMP FAR  
WEST RD. SHERIDAN  
CALIFORNIA 95681

DESIGNED: MYD DATE: 4/11/2003  
DRAWN: MLI  
SCALE: 1"=500'  
SHEET: 506-01-95  
N/A

**G8**



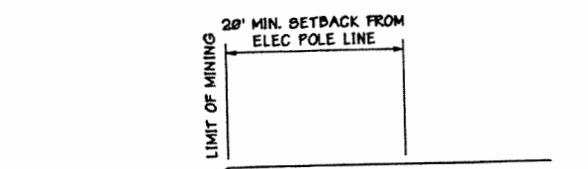
Revisions
DATE
DESCRIPTION
BY
CHK

**PATTERSON SAND & GRAVEL**  
**PHASE 4 DRAINAGE CHANNEL**  
**DETAIL AND SECTION PLAN**

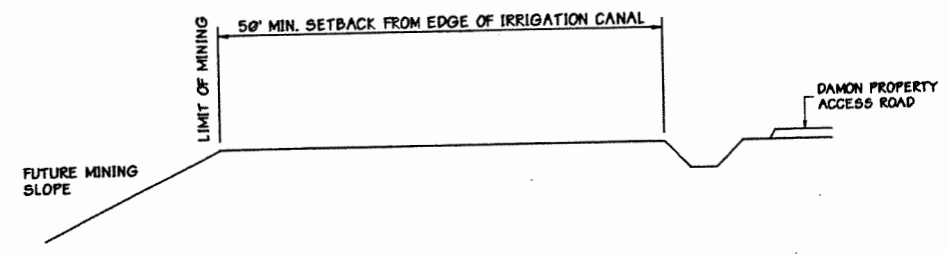
**Project Location:**  
Patterson Sand & Gravel  
8705 Camp Far West Road  
Sheridan, California

**Ownership Information:**  
Patterson Sand & Gravel  
P.O. Box 12  
Sheridan, California 95881

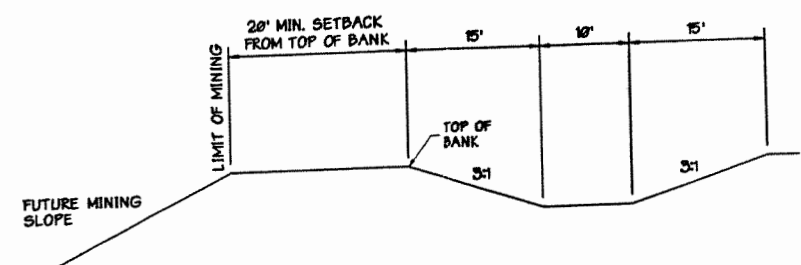
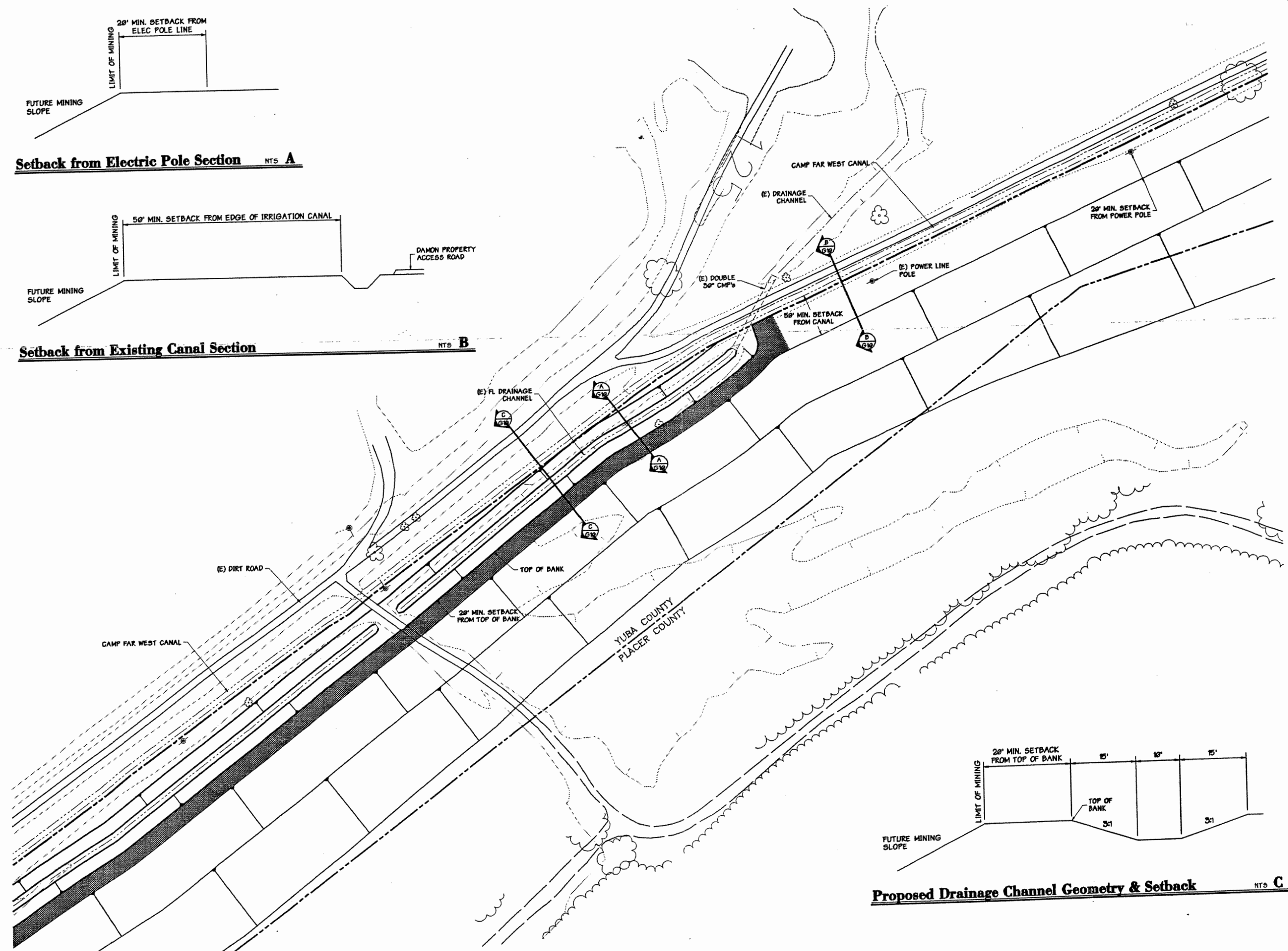
DESIGNED: DB	DATE: 4/1/2003
DRAWN: M.T.	PROJ. SCALE: 1"=50'
INVS. TO: 5126-01-95	VERT. SCALE: N/A
SHEET:	



**Setback from Electric Pole Section** NTS **A**



**Setback from Existing Canal Section** NTS **B**



**Proposed Drainage Channel Geometry & Setback** NTS **C**



**SCHEMATIC**  
NOT FOR CONSTRUCTION

Revisions	DATE	DESCRIPTION

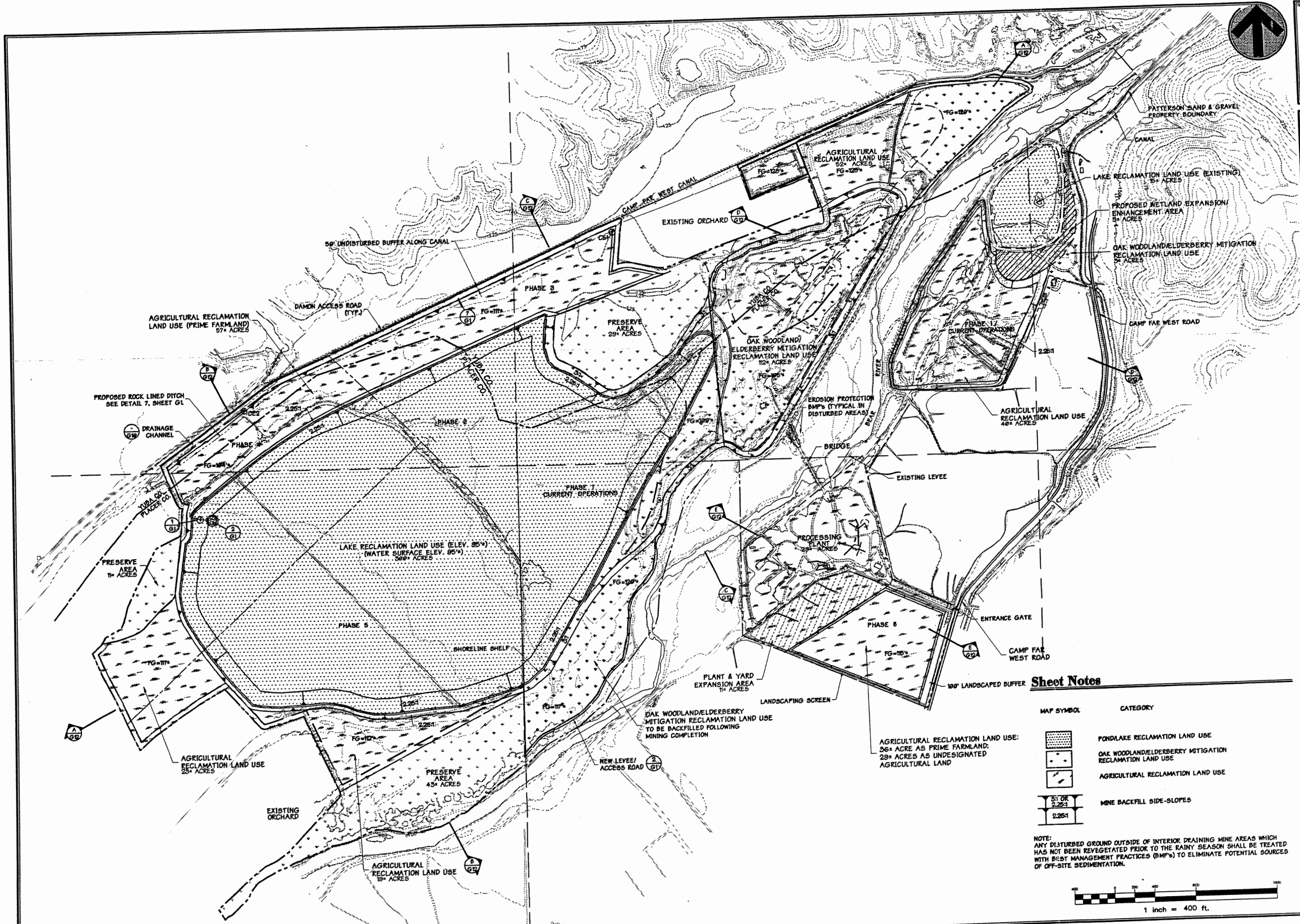
**PATTERSON SAND & GRAVEL**  
**FINAL GRADING AND**  
**MINE RECLAMATION PLAN**

**Project Location:**  
Patterson Sand & Gravel  
8705 Camp Far West Road  
Sheridan, California

**Ownership Information:**  
Patterson Sand & Gravel  
P.O. Box 12  
Sheridan, California 95881

DESIGNED	M/D	DATE	6/1/2003
DRAWN	M	SCALE	T=400'
CHECKED		BY	
DATE	5/16-01-98	BY	N/A

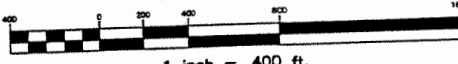
**G10**

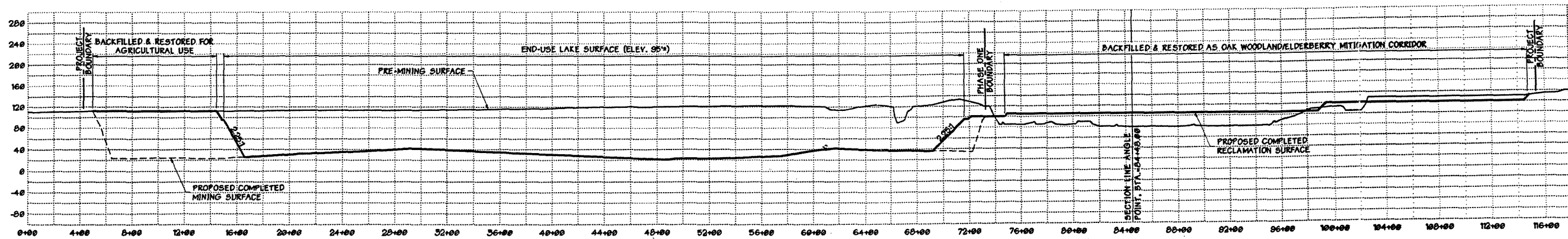


**Sheet Notes**

MAP SYMBOL	CATEGORY
[Symbol]	PONDLAKE RECLAMATION LAND USE
[Symbol]	OAK WOODLAND/ELDERBERRY MITIGATION RECLAMATION LAND USE
[Symbol]	AGRICULTURAL RECLAMATION LAND USE
[Symbol]	MINE BACKFILL SIDE-SLOPES

NOTE: ANY DISTURBED GROUND OUTSIDE OF INTERIOR DRAINING MINE AREAS WHICH HAS NOT BEEN REVEGETATED PRIOR TO THE RAINY SEASON SHALL BE TREATED WITH BEST MANAGEMENT PRACTICES (BMPs) TO ELIMINATE POTENTIAL SOURCES OF OFF-SITE SEDIMENTATION.

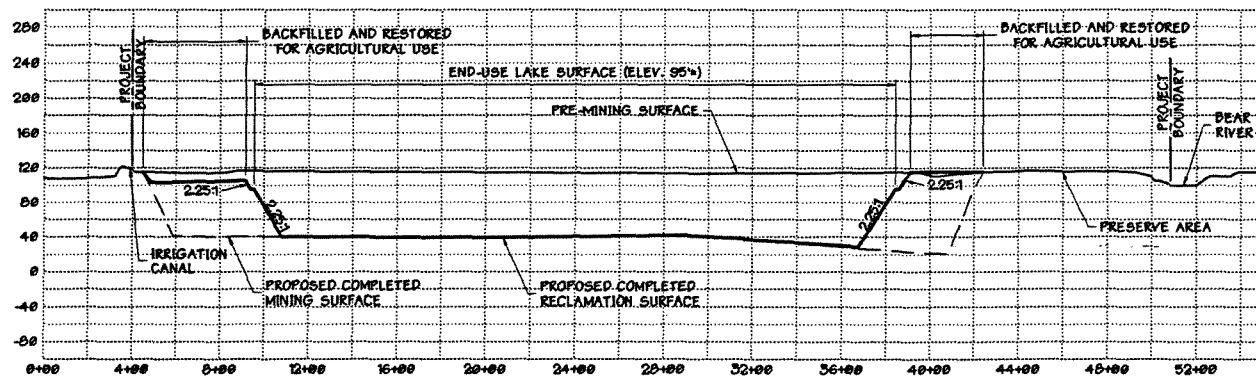




Section A

SCALE: HORIZ=400', VERT: 1"=100'

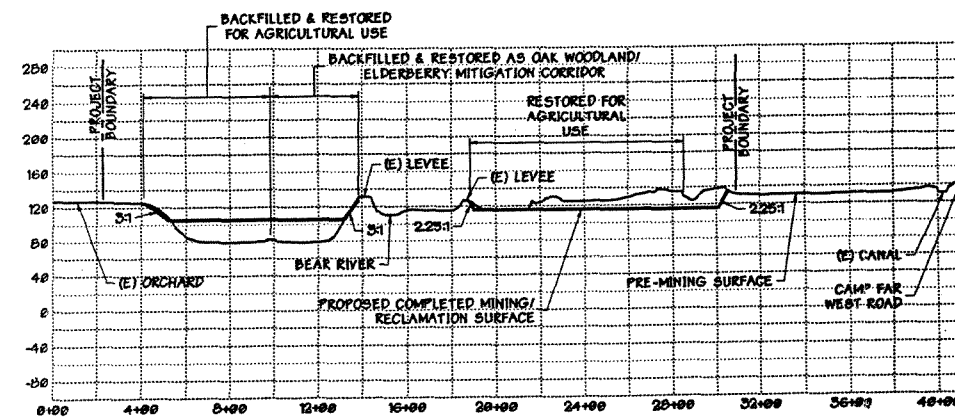
A



Section B

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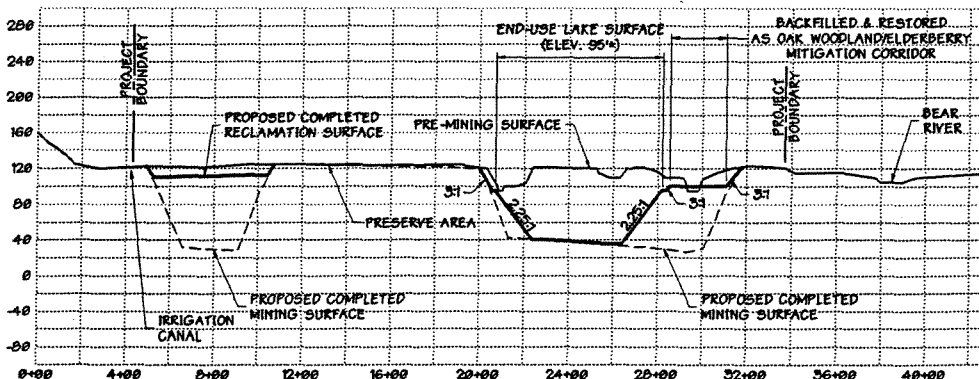
B



Section D

SCALE: HORIZ=400', VERT: 1"=100'

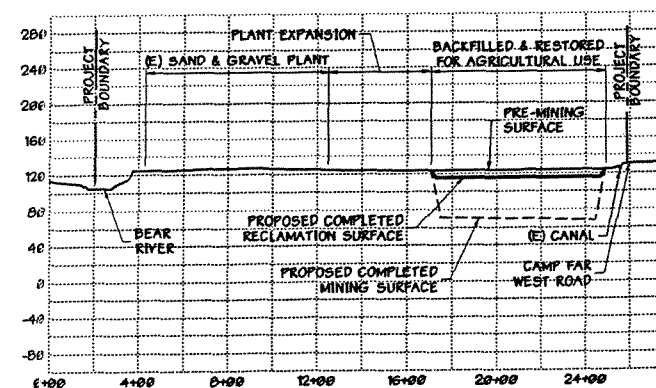
D



Section C

SCALE: HORIZ=400', VERT: 1"=100'

C



Section E

SCALE: HORIZ=400', VERT: 1"=100'

E



Revisions	BY	
	DATE	
	DESCRIPTION	
	DATE	

PATTERSON SAND & GRAVEL

CROSS SECTIONS

Project Location:  
Patterson Sand & Gravel  
8705 Camp Far West Road  
Sheridan, California

Ownership Information:  
Patterson Sand & Gravel  
P.O. Box 12  
Sheridan, California 95681

DESIGNED	M/D	DATE	6/1/2003
DRAWN	M/J	HORIZ. SCALE	1"=400'
JOB No.	3106-01-00	VERT. SCALE	1"=100'
SHEET			






Bore #	By	Equipment	Date	Elevation			
CE1	DD	CME-55 HT w/ 6" HOLLOW-STEM AUGERS	02/05/2000	125'			
ELEV. (FT)	DEPTH (FT)	MATERIALS DESCRIPTION	SAMPLE No.	Field q <sub>u</sub> (ksf)	SPT (blows/ft)	DRY DENSITY (pcf)	MOISTURE (%)
125	0						
124	1	Brown Silty Medium SAND (SM), Damp, Loose					
123	2						
122	3						
121	4						
120	5						
119	6	Light Brown Very Fine Sandy SILT (ML), Dry, Medium Stiff	CE1-1	0.8			
118	7		CE1-2		5	71.7	11.6
117	8						
116	9						
115	10						
114	11	Brown Slightly Very Fine Sandy SILT (ML-SM), Damp, Medium Stiff, (Highly Erodible)	CE1-3	0.8		76.1	25.7
113	12		CE1-4		6		
112	13	Pulk A (SP-H) 7					
111	14						
110	15						
109	16	Brown Fine Sandy Clayey SILT (ML), Damp, Medium Stiff	CE1-5	0.75		82.7	25.5
108	17		CE1-6		6		
107	18						
106	19						
105	20	Brown Fine Sandy Clayey SILT (ML-CL), Damp, Medium Stiff		1.0			
104	21	Brown Slightly Silty Very Coarse SAND (SP), Damp, Medium Dense	CE1-7	0.8			
103	22	(Highly Erodible)	CE1-8		7		
102	23	Very Difficult Drilling					
101	24	Groundwater Encountered					
100	25	Brown Silty SAND & GRAVEL to 2 1/2", Wet, Dense		0.8			
99	26	(Built Sample from Cal Sampler 25'-26 1/2')	CE1-9		30		
98	27						
97	28	Moderate-Difficult Drilling					
96	29						
95	30						
94	31	Brown Silty SAND(SM), Damp, Loose	CE1-10	0.75		87.8	54.8
93	32	Blue Silty SAND (SM), Damp, Loose	CE1-11	1.0	7		
92	33						
91	34	Very Difficult Drilling					
90	35						
89	36	Recovery Consists of Disturbed Brown Fines & SAND (GM), Wet, Dense			36		
88	37						
87	38						
86	39						
85	40	Brown Clean Slightly Silty Medium SAND (SP), Wet, Medium Dense		0.8			
84	41	Brown Silty SAND & GRAVEL (GM), Wet, Medium Dense	CE1-12		26		
83	42		CE1-13				
82	43						
81	44						
80	45	Brown Silty Well-Graded SAND & GRAVEL to T, Wet, Dense	CE1-14				
79	46	(Very Little Recovery)					
78	47	Very Difficult Drilling					
77	48						
76	49						
75	50	Very Difficult Drilling					
74	51						
73	52	Boring Continued on Next Column					


Bore #	By	Equipment	Date	Elevation			
CE1	DD	CME-55 HT w/ 6" HOLLOW-STEM AUGERS	02/05/2000	125'			
		MATERIALS DESCRIPTION	GEOTECHNICAL				
ELEV. (FT)	DEPTH (FT)		SAMPLE No.	Field $q_u$ (ksf)	SPT COUNT	DRY DENSITY	MOISTURE CONTENT
73	52	Continued from Previous Column					
72	53						
71	54						
70	55						
69	56	SPT Sampler Refusal (Cable)	--		52/0"		
68	57	Brown Clayey Silty SAND & GRAVEL (SMGC), Wet, Dense (Recovery Very Difficult)	--	--			
67	58						
66	59	Very Difficult Drilling					
65	60						
64	61						
63	62	Drilling Becomes Smoother					
62	63						
61	64	Light Brown CLAY (CL) w/ SAND, Damp, Hard	CE1-15	2.25	38/0"		
60	65						
59	66						
58	67						
57	68						
56	69						
55	70						
54	71	Light Brown CLAY (CL) w/ SAND, Damp, Hard	CE1-16	2.5	58/0"		
53	72						
52	73						
51	74						
50	75						
49	76						
48	77	Drilling Becomes Difficult on Gravel					
47	78						
46	79	Intermittent Thin (6"-12") Layers of Smooth Drilling					
45	80	Difficult Drilling					
44	81	Auger Refusal on Rock (1/4" Advance in 30 Min.)					
	82	Boring Terminated @ 81', Backfilled w/ Cuttings					

Bore #	By	Equipment	Date	Elevation			
CE2	DD	CME-55 HT w/ 6" HOLLOW-STEM AUGERS	02/05/2000	115'			
		MATERIALS DESCRIPTION	GEOTECHNICAL				
ELEV. (FT)	DEPTH (FT)		SAMPLE No.	Field q <sub>u</sub> (ksf)	SPT COUNT	DRY DENSITY	MOISTURE CONTENT
120	0						
119	1	Brown Medium SAND w/ SILT (SM) w/ Trace Fes Gravel, Damp, Loose					
118	2						
117	3						
116	4						
115	5						
114	6	White Coarse SAND & GRAVEL to 2 1/2" (SP/GF), Damp, Loose (No Binder, Highly Erodible)	CE2-1 CE2-2	0.8	4	85.8	4.2
113	7						
112	8						
111	9						
110	10						
109	11	White Coarse SAND w/ Trace Rounded Fes Gravel (SP), Damp, Very Loose, (No Binder, Highly Erodible)	CE2-3 CE2-4	0.8	3		
108	12						
107	13						
106	14						
105	15						
104	16	Light Brown Coarse SAND & Rounded GRAVEL to 1/2" (SP/GF), Damp, Loose (No Binder, Highly Erodible)	CE2-5	0.8	7	95.2	6.6
103	17						
102	18						
101	19						
100	20	Groundwater Encountered					
99	21	Brown Medium SAND (SP) w/ SILT & Trace Rounded GRAVEL, Wet, Loose, (Little Binder, Highly Erodible)	CE2-6	0.8	6	94.5	20.5
98	22						
97	23						
96	24						
95	25						
94	26	Dark Green Coarse SAND & GRAVEL to T (SP/GF) w/ Some SILT, Wet, Medium Dense, (Little Binder, Highly Erodible)	CE2-7	0.8	27	105.7	22.1
93	27						
92	28						
91	29						
90	30						
89	31	No Recovery (SAND)	--	--	8		
88	32						
87	33						
86	34						
85	35	Dark Green Coarse SAND & Rounded GRAVEL to T (SP/GF), Clean, Damp, Dense		0.8			
84	36	Dark Green Clayey Coarse SAND & Angular GRAVEL (SP/GF), Wet, Dense, (Moderately Erodible)	CE2-8	0.8	55	103.5	8.8
83	37						
82	38						
81	39						
80	40						
79	41	No Recovery	--	--	38		
78	42						
77	43						
76	44						
75	45						
74	46	No Recovery	--	--	62/1 1/2"		
73	47	Red Brown Medium SAND (SP/SC) w/ CLAY, Wet, Dense	CE2-9 CE2-10	0.8	42		
72	48						
71	49						
70	50						
69	51	Red Brown Clayey Medium-Coarse SAND & GRAVEL to T (GC), Damp, Very Dense, (Angular & Rounded Gravel)	-- CE2-11	1.0	50		
68	52	Boring Continued on Next Column					

Bore #	By	Equipment	Date	Elevation			
CE2	DD	CME-55 HT w/ 6" HOLLOW-STEM AUGERS	02/05/2000	115'			
		MATERIALS DESCRIPTION	GEOTECHNICAL				
ELEV. (FT)	DEPTH (FT)		SAMPLE No.	Field $q_u$ (Tons/SqFt)	SPT COUNT	DRY DENSITY	MOISTURE CONTENT
68	52	Continued from Previous Column					
67	53						
66	54						
65	55						
64	56	Red Brown Clayey Medium-Coarse SAND & Angular & Rounded GRAVEL to F (GC) Damp, Very Dense	CE2-12	15	58/5"		
63	57	Very Difficult Drilling					
62	58						
61	59						
60	60						
59	61	Very Difficult Drilling					
58	62						
57	63						
56	64						
55	65	Sampler Refusal (25 Blows for 2" Advance)					
54	66	No Recovery					
53	67	Very Difficult Drilling					
52	68	Very Difficult Drilling					
51	69						
50	70	CLAY/SAND/GRAVEL/Cobble (CL/GC), Very Difficult Drilling					
49	71	No Recovery			37/5"		
48	72						
47	73	CLAY/SAND/GRAVEL/Cobble (CL/GC), Very Difficult Drilling					
46	74						
45	75	Intermittent Easy Drilling in Clay Layers at Thick					
44	76						
43	77						
42	78						
41	79						
40	80						
39	81	Red Brown & Light Brown & Light Blue CLAY (CL) w/ Some Coarse SAND & Trace Gravel to 1/2", Damp, Hard	CE2-13 CE2-14	4.5+	74	110.4	19.1
38	82						
37	83						
36	84						
35	85	Extremely Slow Drilling in Stiff Clays					
34	86						
33	87						
32	88						
31	89						
30	90						
29	91	Brown Sandy CLAY (CL), Damp, Hard	CE2-15	4.5+	76		
28	92	Boring Terminated @ 81 1/2", Back-filled w/ Cuttings					



**CARLTON**  
Engineering Inc.  
1821 Piedmont Road, Suite 200, San Jose, CA 95131  
Phone: 408.877.8514 Fax: 408.877.8515



**SCHEMATIC**  
NOT FOR CONSTRUCTION

Revisions

Rev	Date	By	Description

**PATTERSON SAND & GRAVEL**

**EXPLORATORY BORING LOGS**

**Project Location:**  
Patterson Sand & Gravel  
8705 Camp Far West Road  
Sheridan, California

**Ownership Information:**  
Patterson Sand & Gravel  
P.O. Box 12  
Sheridan, California 95681

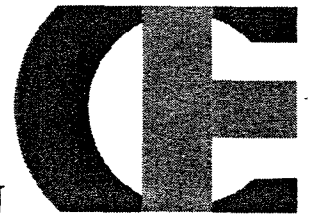
DESIGNED: M/D DATE: 4/1/2003  
DRAWN: M/L  
JOB NO: 306-01-00  
SHEET: 12

SCALE: N/A  
SCALE: N/A

**612**

# Memorandum

Mar 22 2000



From: Dana Dean

CARLTON

Engineering Inc.

For: Lloyd Burns

Patterson Sand & Gravel

8705 Camp Far West Road, P.O. Box 12

Sheridan CA 95681

Fax 530 633.9229

Work 530 633.2232

Work 888 477.7263

Re: **Mining Cut Slopes - Phases 2 thru 4**

98-061 Patterson Sand & Gravel Mine Plan & Rec.

Total Number of Pages: 1

## Comments:

Lloyd:

This memo contains our geotechnical recommendations for proposed mining cut slopes in Phases 2 through 4. Cut slopes are proposed to be as high as 100 vertical feet. Phases 2 through 4 abut an existing canal along the northwesterly boundary for a plan view distance of approximately 5,200 feet.

Our study consisted of drilling two borings to depths of between 81 and 92 feet. Sampling was performed at approximately 5 feet depth intervals in the top 45 feet, and approximately every 10 feet below, staggered between the two borings. Materials encountered were generally SANDs and GRAVELs with relatively thin layers of SILTs and CLAYs, with CLAY becoming predominant below depths of 60 to 70 feet. Groundwater was encountered at depths between 20 and 25 feet.

Laboratory testing consisted of moisture and density of relatively undisturbed samples. A direct shear test was performed on one relatively undisturbed sample of Sandy SILT / Silty SAND (ML/SM) (sample CE1-3, 10.5-11 feet). The results are a friction angle of 28-degrees and a cohesion of 134 psf.

Conditions significant to an evaluation of mining cut slope stability are the relatively shallow groundwater table, the highly permeable SANDs below the water table, the relatively higher penetration resistance values (N values) encountered below a depth of approximately 35 feet. Materials above a depth of 35 feet can be generally categorized as lower strength and considered less stable if excavated to expose a free face. Materials below 35 feet are generally considered to be stronger and considered stable if excavated to expose a free face.

Slopes constructed as recommended below are estimated to have a factor of safety of approximately 1.5 or more.

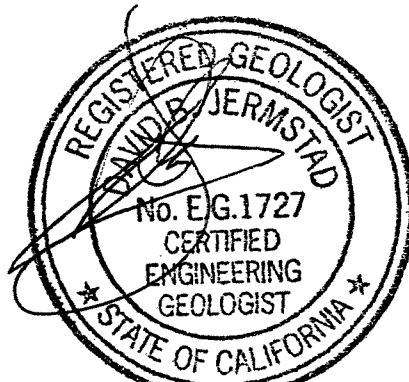
## RECOMMENDATIONS

1. Mining cut slopes above a depth of 35 feet below existing ground should be no steeper than 2.0:1 (H:V).
2. Mining cut slopes below a depth of 35 feet below existing ground should be no steeper than 1.75:1 (H:V).
3. Mining cut slopes should be no closer than 50 feet (in plan view) from the existing concrete lined canal to the north.
4. It is our understanding that the mine reclamation plan includes backfilling mining slopes to inclination of 2.25:1 (H:V) or flatter.

Sincerely,

Carlton Engineering, Inc.  
Dana Dean

*For*



CC:

3932 Ponderosa Road Ste 200 Shingle Springs, CA 95682 phone 530.677.5515 fax 530.677.6645 Email: dbjerm@ceiengr.com

STRUCTURAL CIVIL LAND SURVEYING ARCHITECTURE EARTH SCIENCE



**Patterson Sand and Gravel  
Proposed Financial Assurance**

Mine Name: Patterson Sand and Gravel, CA Mine ID# 91-31-009

Current Disturbed Area: 195 acres

Date of Estimate: 5/16/03

DESCRIPTION	QUANTITY	UNIT PRICE	COST
<b>Primary Reclamation Activities</b>			
Mobilize (lump sum, approximately 1% of Direct Cost)	1	\$4,000	\$4,000
Reshape Slopes to 2.25:1, (30 acres slope area)			
Dozer, hrs (equip.+ operator)	100 hrs	\$100	\$10,000
Backfill Mine Excavation North of Bear River Meander Bend	300,000 CY	\$1	\$300,000
Total Primary Activities			\$314,000
<b>Revegetation</b>			
Topsoil Spreading, slopes (20 acres)			
Dozer/Scraper combin., hrs (equip.+ operator)	50 hrs	\$185	\$9,250
Straw Rolls	9000 ft	\$1.29	\$11,610
Straw Mulch (slopes) - Straw	25 ac	\$220	\$5,500
Spread Straw (mechanical)	25 ac	\$26	\$650
Punching	25 ac	\$94	\$2,350
Seeding Annuals - Seed	110 ac	\$85	\$9,350
Prepare Seedbed	110 ac	\$60	\$6,600
Spread Seed (mechanical)	110 ac	\$62	\$6,820
Fertilizer	110 ac	\$80	\$8,800
Planting Trees & Woody Species (main pit slopes)			
Seedling Trees	25 ac	\$268	\$6,700
Woody Shrubs	25 ac	\$352	\$8,800
Planting	25 ac	\$240	\$6,000
Watering (Water Truck, per hour)	125 hr	\$60	\$7,500
Total Revegetation			\$89,930
<b>Plant Structures and Equipment Removal</b>			
Plant equipment removal cost offset by salvage value			
Concrete Slab and Foundation Removal			\$6,440
Total Structures and Equipment Removal			\$6,440

**Patterson Sand and Gravel  
Proposed Financial Assurance**

DESCRIPTION	QUANTITY	UNIT PRICE	COST
<b>Monitoring</b>			
Monitoring - 3 years	12 events	\$300	\$3,600
Total Monitoring			\$3,600
<b>Miscellaneous Costs</b>			
Water Well Destruction	1 well		\$2,500
Lead Agency Final Inspection	1 inspection		\$300
Total Miscellaneous Costs			\$2,800

Subtotal (Direct Costs)	\$416,770
Reclamation Management (5%)	\$20,839
Profit & Overhead (11%)	\$45,845
Contingency (10%)	\$41,677
County Administrative Costs (10%)	\$41,677
Total	\$566,807
Total Financial Assurance	\$566,800

**Appendix B**

Product list

Current Mining Equipment List

Biological Resources Assessment (November 2000)

Revised Biological Mitigation Plan (April 2001)

U.S. Army Corps of Engineers Wetlands Concurrence

Exploratory Drilling Report



8705 Camp Far West Road.  
P.O. Box 12 • Sheridan, CA 95681-0012  
(530) 633-2232 • Fax (530) 633-9229

**PRICE LIST**

Effective April 1, 2000

All Prices FOB Plant

Toll Free 1 (888) 477-SAND (7263)

**WHITE SAND PRODUCTS**

#1 Fine White Topdressing Sand	10.25/ton
#2 Fine White Bunker Sand	9.50/ton

**SAND PRODUCTS**

Concrete Sand	6.75/ton
Plaster Sand	7.25/ton
Mason Sand	7.25/ton
Fill Sand	5.00/ton
PG&E Sand	6.75/ton

**ROUND ROCK PRODUCTS**

3/16" Pipe Bedding	5.50/ton
1/4" x 3/8" Pea Gravel	6.00/ton
3/4" Round Rock	5.75/ton
1" Round Rock	5.75/ton
1-1/2" Drain Rock	6.25/ton
2" x 6" Cobble	7.00/ton
6" x 12" Cobble	7.25/ton

**CRUSHED PRODUCTS**

1/2" Crushed	7.50/ton
3/4" Crushed	7.25/ton
1-1/2" Crushed	7.25/ton
3/4" Class II Aggregate Base	6.25/ton
1-1/2" Class II Aggregate Base	6.75/ton
1/2" Crusher Run	6.75/ton
Aggregate Subbase	4.00/ton

**TOPSOIL MATERIALS**

Screened Topsoil	7.00/ton
Unscreened Topsoil	4.75/ton

**MIXED MATERIALS**

Grout Mix	7.25/ton
Concrete Mix	7.25/ton
3/4" Concrete Mix	7.25/ton

<b>MINIMUM LOAD CHARGE</b>	<b>26.81/load</b>
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**PLEASE CALL FOR DELIVERED PRICES**  
**PRICES SUBJECT TO CHANGE WITHOUT NOTICE**

Patterson Sand & Gravel does not guarantee the availability  
of the above materials.

*Quantity purchases subject to individual quotation.*

**Patterson Sand and Gravel  
Major Plant Equipment List**

**Quantity      Description**

**Major Mobile Equipment:**

2	Komatsu PC400 Excavators
1	Cat 350L Excavator
3	Cat D400D Haul Trucks
4	Cat 631 Scrapers
1	Cat 633 Scraper
1	Komatsu WA600 Loader
1	Komatsu WA500 Loader
1	Cat 980B Loader
1	Cat 980C Loader
1	Cat 980F Loader
1	Cat D-6H Dozer

**Major Plant Equipment:**

**Topsoil**

1	Powerscreen Chieftan Plant Old Wash Plant
1	Drive Over Grizzly
1	Hewitt Robbins 4 x 8 Vibrating Grizzly
1	ElJay 6 x 16 3 Deck Wet Screen
1	Eagle Iron Works Log Washer
1	Hewitt Robbins 5 x 12 3 Deck Wet Screen
1	Eagle Iron Works 10 x 40 Mark V Sand Classifier

**New Wash Plant**

1	Drive Over Grizzly
1	ElJay 6 x 16 3 Deck Wet Screen

**New Crusher Plant**

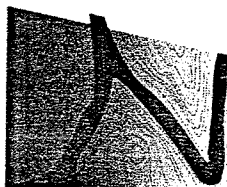
1	Tunnel Feeder
1	Nordberg 2812 G-Cone Crusher
1	Nordberg HP500SX Cone Crusher
2	ElJay 7 x 20 3 Deck Dry Screens

**BIOLOGICAL RESOURCES ASSESSMENT  
FOR THE  
PATTERSON SAND & GRAVEL/  
DAMON ORCHARD EXPANSION AREA  
PLACER COUNTY, CALIFORNIA**

*Prepared For:*

Patterson Sand & Gravel  
PO Box 12  
Sheridan, California 95681  
(530) 633-2232

*Prepared By:*



north  
associates  
fork

1449 Lincoln Way, Auburn, California 95603  
(530) 887-8500

**BIOLOGICAL RESOURCES ASSESSMENT  
FOR THE  
PATTERSON SAND & GRAVEL  
DAMON ORCHARD EXPANSION AREA  
  
PLACER AND YUBA COUNTIES, CALIFORNIA**

## **INTRODUCTION**

---

A biological and wetlands resources investigation has been conducted for a ±467 acre portion of the Patterson Sand and Gravel/Damon Estate Proposed Expansion project site. This investigation addresses the expansion area with regard to habitats present and the potential for special-status species occurrence. The existing operation (east of the section line and south of the county line) is not treated in this document. However, elderberry plants in the existing operation are identified and presented under separate cover.

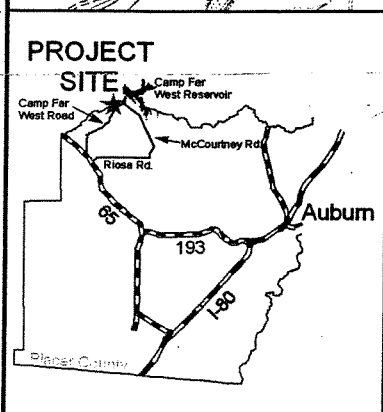
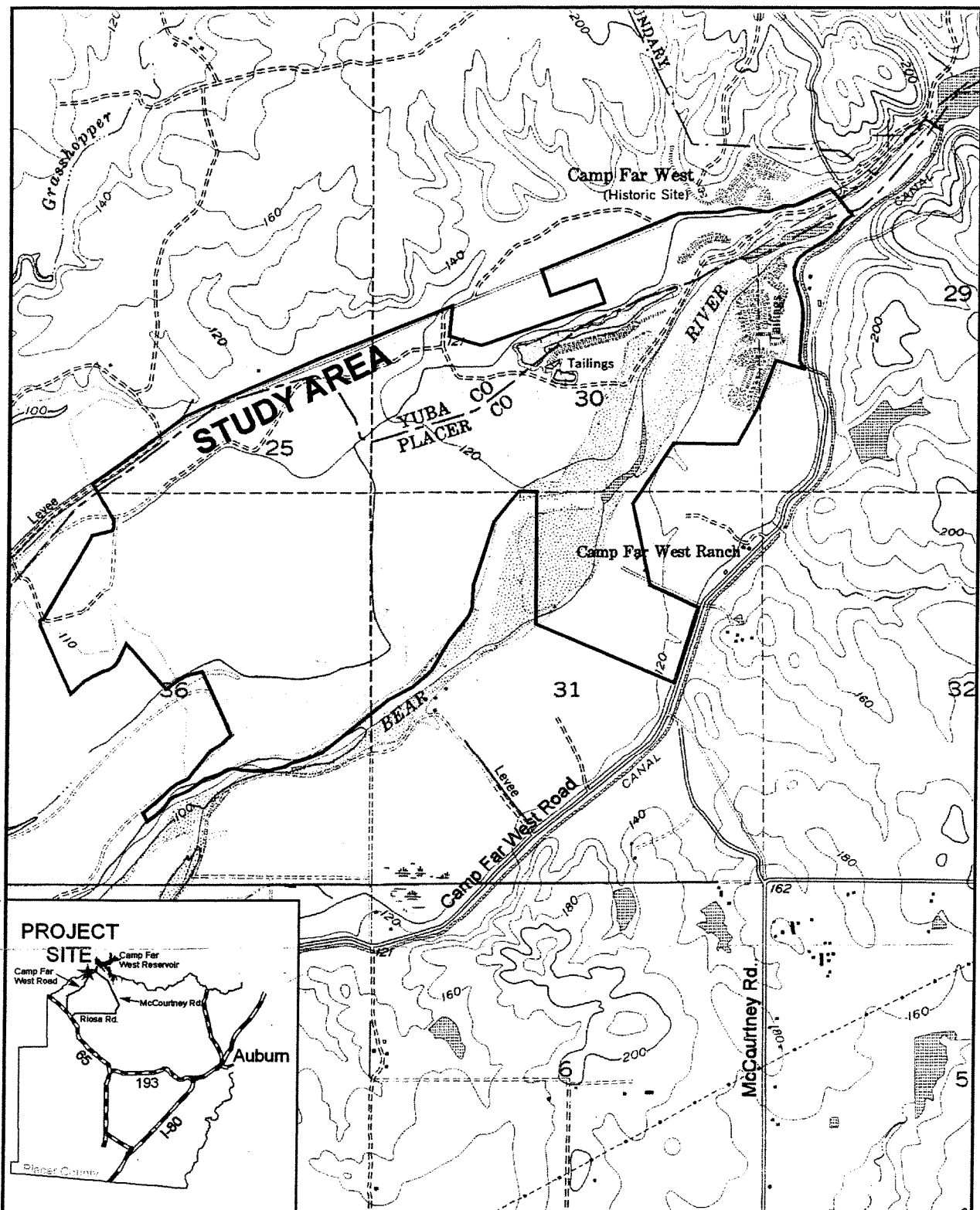
The project site is two parcels separated by a walnut orchard. It is located in northwestern Placer County and southern Yuba County. The site is approximately 2.5 miles northeast of Sheridan in sections 25, 30, 31, and 36, Township 13 & 14N, Range 5 & 6E of the Camp Far West 7.5 minute topographic quadrangle (Figure 1). Coordinates to the approximate center of the project area are: 39° 01' 46" N and 121° 21' 08" W.

## **ENVIRONMENTAL SETTING**

---

The project site is located north of and adjacent to the Bear River, in its historic floodplain. The entire area contains deep, coarse soils, primarily sand and larger grained material. In the nineteenth century, placer mining in the Sierra Nevada Mountains washed huge amounts of sediment down the Bear River drainage, leaving deep deposits in the project area. Since Camp Far West dam was constructed in 1962, periodic very high flood flows were reduced which in turn effectively squeezed the river into a narrower corridor. Highest release out of Camp Far West during the January 1997 floods was approximately 34,000 cubic feet per second. These flows were relatively contained and the riverbed maintained its original location. The project area is located on the adjacent high bench next to the river. The river elevation is approximately 91 feet above sea level and the relatively flat adjoining bench is approximately 113 feet above sea level—a twenty-two foot difference. The material in this twenty-two feet is primarily sand and gravel.

The deep dry soils of the floodplain support annual grassland and oak woodland communities. Valley oak is the most common tree species. Shrubs are also abundant in many areas.



0 1000 2000  
Approximate scale in feet



Camp Far West USGS 7.5 minute  
topographic quadrangle

Figure 1

## VICINITY AND LOCATION MAP

*Patterson Sand and Gravel*  
Placer and Yuba Counties, California



## Biological Resource Assessment Objectives

The biological resources assessment of the Patterson Sand & Gravel / Damon Orchard Expansion Area project site was conducted to:

- Identify and describe the biological communities present on the project site
- Record plant and animal species observed on the project site
- Evaluate and identify sensitive resources and special status plant and animal species observed or potentially occurring within the project area

## METHODOLOGY

---

### Literature Review

The following publications were among those reviewed to provide information on life history, habitat requirements, distribution, and conservation status of regionally occurring plant and animal species—*The Inventory of Rare and Endangered Vascular Plants of California* (California Native Plant Society 1994), *The Jepson Manual, Higher Plants of California* (Hickman 1993), *California Birds: Their Status and Distribution* (Small 1994), *California's Wildlife*, Volumes I-III (Zeiner *et al.* 1988, 1990a, 1990b) *Amphibian and Reptile Species of Special Concern in California* (Jennings and Hayes 1994), *Lives of North American Birds* (Kaufman 1996), *A Field Guide to Western Reptiles and Amphibians* (Stebbins 1985), *A Field Guide to the Mammals* (Burt and Grossenheider 1976) and *A Field Guide to Western Birds* (Peterson 1990).

### Natural Diversity Data Base Report

The California Department of Fish and Game's (CDFG) Natural Diversity Data Base (NDDB) (CDFG 1999) contains records of reported occurrences of rare native species and unique natural communities. Legal status, observation dates, locations, habitats, ecological descriptions, and population data are available through the database. The NDDB was recently queried for any additional information that may have been made available since the original report. The Camp Far West, California 7.5 minute USGS topographic quadrangle and the three closest adjoining topographic quadrangles (approximately 220 square miles) were searched.

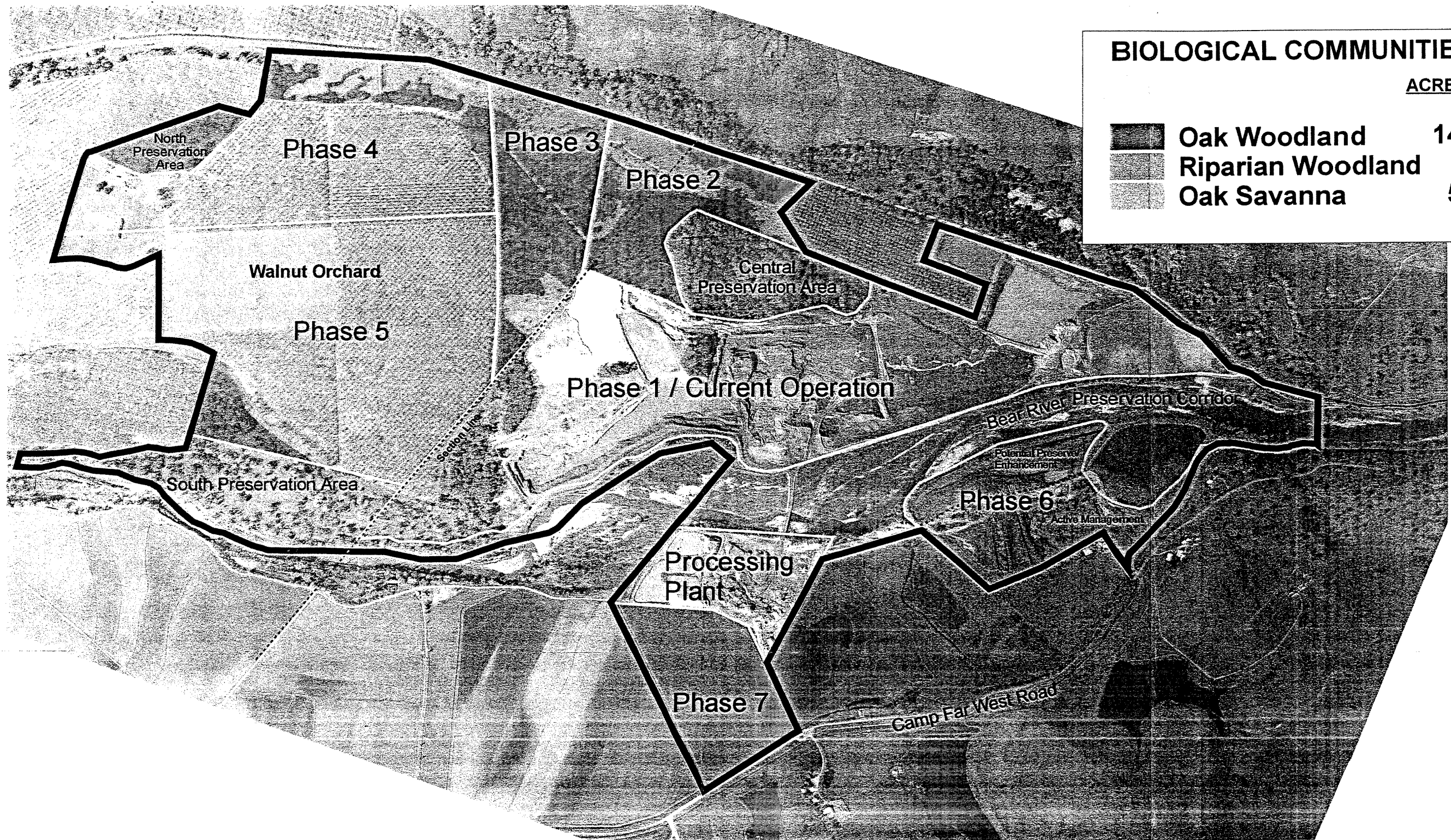
### Field Assessment

The original field surveys were conducted by Jeff Glazner during five field days in August and September 1996. Field surveys for this revised document were made on numerous occasions from 1997 through July 2000, both by vehicle and on foot. On-site habitats were evaluated for their potential to support regionally occurring special status plant and animal species.

## BIOLOGICAL COMMUNITIES

---

The biological communities described in this section include a characterization of the plant communities and associated wildlife habitats (Figure 2).



Notes: Approximately 269 acres of agricultural land will be mined.

0 1000  
Approximate Scale in Feet

Photograph Date: 1-27-2000 by Towill, Inc.



Figure 2

**HABITAT MAP WITH PHASING**  
PATTERSON SAND AND GRAVEL  
Placer and Yuba Counties, California

Plant communities (vegetation) are mapped in the field and when possible are described according to the California Department of Fish and Game's NDDB list of California terrestrial natural communities (CDFG 1999) and the California Native Plant Society's *A Manual of California Vegetation* (Sawyer and Keeler-Wolf 1995). The most recent NDDB list is based on the classification system in the manual and is compatible with previous NDDB natural communities lists. Plant species identifications and botanical nomenclature follow the *Jepson Manual* (Hickman 1993).

Wildlife is described in the framework of the CDFG Wildlife Habitat Relationship System (WHR)(Mayer and Laudenslayer 1988). The WHR contains information on the relationship between wildlife species and their habitats. The WHR provides a cross-reference between vegetation classification systems and wildlife habitat. This methodology allows one to map plant communities and compare them to the descriptions in the WHR and to put together a predictive list of keystone species. This proves valuable in identifying possible special status species that share similar ecological niches and distribution.

Wildlife habitat descriptions are often closely tied to observations of birds because of their conspicuous nature. Reptiles, amphibians, and small mammals are, because of their secretive nature, rarely observed during surveys and their presence is inferred through both indirect signs (e.g. tracks, scat, etc.) and an understanding of their behavioral ecology. Avian nomenclature follows the *A.O.U. Check-list of North American Birds* (1998).

Natural biological communities/habitat types found in the project study area include (Table 1):

**Table 1. Acreage of Natural Habitat Types in the Study Area**

Community/Habitat Type	Acreage Present
Oak Savanna	52
Oak Woodland	146
Riparian Woodland	3
<b>Total</b>	<b>201</b>

## **Oak Savanna**

The oak savanna is typified by the dominance of non-native grass species, and many non-native non-grass species. Woody vegetation is lacking to sparse. Trees and shrubs are scattered throughout the grassland but do not occur in large enough numbers to be considered a woodland.

Vegetation. Depending on the level of disturbance, degree of shade, moisture level, and other environmental factors, several species are considered dominants in this plant community. Yellow star thistle, wild oat, ripgut brome, rose clover, tarweed, telegraph weed, hedge parsley, and filaree are among the most common herbaceous species in the savanna areas. Scattered oak, pine, and shrubs dot the savanna area.

A few peculiar plant associations are worth noting, occurring primarily in the savanna areas. Deer grass, a locally common bunchgrass, is species is typically associated with wetland fringes. Here it grows in dry sandy conditions as a local dominant with yellow star thistle, ripgut brome and rose clover, all obligate upland species.

Wildlife. Non-native annual grassland habitat provides habitat for ground-nesting bird species, including western meadowlark, horned lark, lark sparrow and mourning dove. Many species may use the grasslands and adjacent wooded areas while foraging including wild turkey, California quail, rufous-sided towhee, California towhee, western kingbird, and rufous-crowned sparrow. Raptors, such as red-tailed hawks, red-shouldered hawk, white-tailed kites, American kestrel, great horned owl, and northern harriers forage the grassland for small mammals. Large mammals including fox and coyote forage on small mammals and reptiles. Fossorial mammals such as ground squirrels, pocket gophers and moles utilize the grassland as their primary habitat, as do black-tailed jackrabbit, voles, and deer mice. Reptiles which may occur within the project site include western fence lizard, southern alligator lizard, western skink, common garter snake, gopher snake, and western rattlesnake.

### **Oak Woodland**

Oak woodland is defined here by the dominance of native oak species growing in large enough numbers to effectively change the character of the grassland by the ability to support an additional set of plant and animal species. Oak woodland is the most abundant natural habitat type.

Vegetation. Most of the oak woodland areas are dominated by valley oak. However, the eastern portion of the northern parcel supports numerous interior live oak, and portions of the southern parcel support groves of California black walnut, cottonwood, and tree of heaven. The oak woodland area also supports an abundance of shrub species including poison oak, Himalayan and California blackberry, California buckeye, white leaf manzanita, elderberry, buck brush, coyote bush, and coffeeberry. Herbaceous species vary widely but are most widely represented by rose clover, hedge parsley, dog tail grass and yellow star thistle.

A very large ponderosa pine is located in the northern area in an area where whiteleaf manzanita, and buck brush are common. All are common foothill and low mountain species and are not typically found at this low elevation. The obvious explanation for their occurrence here is they were deposited along with the sediment washed out of the Sierra Nevada mountains during the dredger mining days. The high seed content and the native soils for these species allowed them to colonize the area. As one would expect, most of these species are on the decline and will probably die out with more time. The one exception to this is the healthy population of whiteleaf manzanita on site. Individuals of this species will probably hang on indefinitely.

Wildlife. Several additional wildlife species utilize oak woodlands than the adjacent annual grassland. Bird species may include several raptors (hawks/owls), Nuttall's woodpecker, northern flicker, plain titmouse, bushtit, and white-breasted nuthatch and great horned owl. The shrub-layer may be utilized by scrub jay, Bewick's wren, ruby-crowned kinglet, and



wrentit. The understory grasses and forbs strata include California quail, rufous-sided towhee, California towhee, white-crowned sparrow, and wild turkey.

Mammals typical of the wooded habitat within the project site include mule deer, California ground squirrel, Audubon's cottontail, and western gray squirrel. Many reptiles of open habitats may occur in the wooded areas including western fence lizard, southern alligator lizard, western skink, Gilbert skink, common garter snake, gopher snake, and western rattlesnake.

## **Riparian Woodland**

The term "riparian woodland" is defined here as any area wet enough to support trees and shrubs adapted for growth in moist or saturated conditions. This typically occurs along stream corridors and in non-stream low-lying areas where groundwater is nearer to the surface for extended periods. Riparian woodlands can be wetlands or uplands, and often straddle the line at any given location. One area on the project site is mapped as riparian woodland, located approximately 600 feet north of the Bear River (along an abandoned ditch and the northern boundary of the southern area, see Figure 2). It occupies  $\pm 3$  acres of the south parcel. The land adjacent to the active channel of the Bear River is essentially the same as the oak woodland more throughout the entire south parcel.

We have chosen not to call the areas dominated by valley oak as riparian because of the lack of other riparian species and the dryness of the landscape. Most of the valley oak areas contain a sparse shrub layer and an herbaceous layer of obligate upland species, primarily weedy grasses. Floodplain oak woodland would be a better term (although these oak woodland areas no longer flood).

Vegetation. Plant species common to this non-wetland riparian area include cottonwood and black locust in the tree stratum, willow in the subcanopy stratum, Himalayan blackberry in the shrub stratum, and mugwort in the herbaceous stratum. (The herb layer is not well represented due to the high shrub cover.)

Wildlife. The riparian forested areas contain four strata which provide habitat for many species. Bird species utilizing the canopy and subcanopy include American kestrel, Nuttall's woodpecker, downy woodpecker, northern flicker, plain titmouse, bushtit, and white-breasted nuthatch. Species utilizing the shrub-layer within and adjacent to the forested areas include scrub jay, Bewick's wren, ruby-crowned kinglet, blue-gray gnatcatcher, northern mockingbird, and wrentit. And species found in the understory grasses and forbs included wild turkey, California quail, rufous-sided towhee, California towhee, and rufous-crowned sparrow.

Mammals typically occurring in riparian woodlands include mule deer, California ground squirrel, Audubon's cottontail, coyote, and western gray squirrel. Reptiles observed within the project site include western fence lizard, southern alligator lizard, common garter snake, and gopher snake. Amphibians observed include bullfrog and Pacific chorus frog and western toad.

## Other Habitats

Two large agricultural monocultures make up the balance of the study area. Walnut orchard occurs north of the river and rice occurs south of the river. Habitat value of these areas is minimal.

## SPECIAL STATUS SPECIES ASSESSMENT

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For purposes of this assessment, "special status" has been defined to include those species that are:

- 1) Listed as endangered or threatened under the federal Endangered Species Act (or formally proposed for, or candidates for, listing);
- 2) listed as endangered or threatened under the California Endangered Species Act (or proposed for listing);
- 3) designated as endangered or rare, pursuant to California Fish and Game Code (§1901);
- 4) designated as fully protected, pursuant to California Fish and Game Code (§3511, §4700, or §5050);
- 5) designated as species of concern by U.S. Fish & Wildlife Service (USFWS), or as species of special concern to California Department of Fish & Game (CDFG);
- 6) plants or animals that meet the definitions of rare or endangered under the California Environmental Quality Act (CEQA);
- 7) plants listed as rare under the California Native Plant Protection Act; or
- 8) plants considered by the California Native Plant Society (CNPS) to be "rare, threatened, or endangered in California" (Lists 1B and 2).

Results of the NDDDB query revealed that 9 special status plant and animal species were reported within the area of the Camp Far West, California 7.5' USGS topographic quadrangle and the three closest quadrangles.

Utilizing a combination of this query, pertinent scientific literature, and field evaluations, a total of 13 special status species were judged to have a potential to grow, nest, or otherwise occupy the site for all, or at least part, of their life cycle (CDFG 1999, 2000a, 2000b) (Table 2).

## Plants

The only special status plant species which any real potential occur on the project site is Big-scale balsamroot (*Balsamorhiza macrolepis* var. *macrolepis*), a non-wetland oak woodland/grassland species. This species has no state or federal status but is listed by the

California Native Plant Society as a "List 1B," which means, "plants rare, threatened or endangered in California and elsewhere." This species has been searched for during the numerous field visits and has not been found.

## **Invertebrates**

### *Valley Elderberry Longhorn Beetle*

The Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) (VELB) is associated with live elderberry shrubs, its exclusive host plant. It is listed as threatened by USFWS. The VELB's life history characteristics are assumed to follow a sequence of events similar to that of related taxa. The following is a brief life history discussion from information provided by the USFWS.

Adult VELB typically emerge in May but have been encountered from March through early June. After mating, female VELB deposit eggs in crevices on the bark of living elderberry plants. Upon hatching, VELB larvae bore into the pith of the elderberry, where they remain for up to two years. Mature larvae create an exit hole prior to pupation. Following pupation, adult VELB emerge from the elderberry through these holes. Adults can sometimes be found on elderberry foliage, flowers or stems, or on adjacent vegetation.

The presence of exit holes in elderberry stems is the accepted measure of VELB presence and habitat use, although all larger elderberry shrubs within the known range of the beetle are considered potential habitat and are protected under the Endangered Species Act. The beetle's range extends throughout California's Central Valley and associated foothills from about the 3000 foot elevation contour on the east and the watershed of the Central Valley on the west. All or portions of 31 counties are included.

Each elderberry plant was tagged, numbered, mapped and evaluated. The entire project site, including preservation areas, contains over 400 elderberry shrubs. Areas slated to be mined in the future contain, at present, 225 elderberry plants. Three individuals had characteristic signs of VELB presence.

Table 2. Special status species that could potentially occur on the project site.

Species	Federal	State	CNPS	Habitat	Potential for Occurrence
<b>Plants</b>					
Big-scale balsamroot <i>Balsamorhiza macrolepis</i>	--	--	1B	woodland and grassland	Not seen during field surveys. Survey period late spring.
<b>Invertebrates</b>					
Valley elderberry longhorn beetle <i>Desmocerus californicus dimorphus</i>	FT	--	--	live elderberry shrubs	Possible as the site contains numerous shrubs. Six individual plants showed signs of presence (exit holes).
<b>Birds</b>					
Cooper's hawk <i>Accipiter cooperii</i>	--	CSC	--	woodlands and riparian edge habitat	Site contains suitable habitat. Not observed on site during field surveys.
Northern harrier <i>Circus cyaneus</i>	--	CSC	--		Unlikely nester, but foraging habitat exists on site. Not observed during field surveys.
Swainson's hawk <i>Buteo swainsoni</i>	--	CT	--	riparian woodland	Site contains suitable habitat. Not observed on site during field surveys.
White-tailed kite <i>Elanus leucurus</i>	MNBMC	CFP	--	grassland, woodland	Site contains suitable habitat. Not observed on site during field surveys.
Burrowing owl <i>Athene cunicularia</i>	MNBMC	CSC	--	grasslands	Site contains suitable habitat. Not observed on site during field surveys.
Loggerhead shrike <i>Lanius ludovicianus</i>	MNBMC	CSC	--	grassland, woodland	Site contains suitable habitat. Not observed on site during field surveys.
Bank swallow <i>Riparia riparia</i>	MNBMC	CT	--	vertical banks along waterways	Nesting colony observed along edge of project site during June 2000 field survey.
Tricolored blackbird <i>Agelaius tricolor</i>	MNBMC	CSC	--	marsh, riparian thicket, & grassland	Marginal habitat exists on site. Not observed during surveys.
Western yellow-billed cuckoo <i>Coccyzus americanus occidentalis</i>	MNBMC	CE	--	riparian woodland	Marginal habitat exists on site. Not observed on site during field surveys.
Yellow warbler <i>Dendroica petechia</i>	MNBMC	CSC	--	riparian habitats	Possible, as riparian area contains suitable nesting habitat. Not seen on site during surveys.
Yellow-breasted chat <i>Icteria virens</i>	--	CSC	--	riparian habitats	Possible, as riparian area contains suitable nesting habitat. Not seen on site during surveys.

Federal: FE = Endangered FT = Threatened FSC = Species of special concern MNBMC = U.S. Fish & Wildlife Service -- Migratory Nongame Birds of Management Concern

State: CE = Endangered CT = Threatened CSC = California species of concern CFP = Fully protected by CDFG code

CNPS: 1B = Rare, threatened, or endangered in California and elsewhere 2 = Rare in California, more common elsewhere



## Vertebrates

Special-status bird species with potential to nest on the site are listed below. Surveys for these species have been conducted incidentally (during the elderberry surveys, and other activities where a biologist needed to be on-site). Further surveys may be needed prior to impacts.

Burrowing owl. Burrowing owl (*Speotyto cunicularia*) is a California Department of Fish and Game species of special concern. Burrowing owls typically utilize abandoned ground squirrel (or other mammal) burrows within open grasslands in the Central Valley. They may feed upon insects, small rodents, and lizards. Suitable nesting habitat exists on site but none have been observed.

Loggerhead shrike. Loggerhead shrike (*Lanius ludovicianus*) is a California Department of Fish and Game species of special concern. It nests within woodland habitats and forages on open habitats throughout California. Suitable nesting habitat exists on the site but none have been observed.

White-tailed kite. White-tailed kite (*Elanus leucurus*) is fully protected according to California Fish and Game Code. This species nests in riparian and oak woodlands within the Central Valley and Coast Range typically during May through August. White-tailed kite forage on open grasslands and savanna habitats. Suitable nesting habitat exists on site but none have been observed.

Cooper's hawk. Cooper's hawk (*Accipiter cooperii*) is a California Department of Fish and Game species of special concern and has no federal special-status. Typical nesting and foraging habitat includes riparian woodland, dense oak woodland, and other woodlands near water. Breeding generally occurs in the Sierra Nevada and Coast Range foothills, but in recent years Cooper's hawk have been found nesting in the Central Valley. Suitable nesting habitat exists on site but none have been observed.

Northern harrier. Northern harrier (*Circus cyaneus*), has no federal status and is a California Department of Fish and Game species of special concern. It is known to nest within the Central Valley, along the Pacific Coast, and in northeastern California. Nesting substrate includes emergent wetlands and open grasslands. Foraging occurs within a variety of open habitats. This species may forage on the project site but nesting potential is low.

Swainson's hawk. The Swainson's hawk (*Buteo swainsoni*) is a threatened species pursuant to the California Endangered Species Act, but has no federal status. Swainson's hawk nest in North America (Canada, western United States, and Mexico) and winter in South America (mainly Argentina). The breeding season generally occurs between mid-March and late-August. Typical nesting areas within the Central Valley include riparian woodland, roadside trees and isolated trees within agricultural zones. Most common nest trees include cottonwoods, willows, valley oak, and walnut. In general, foraging habitat includes open grassland, low-cover row crops and livestock pasture. Alfalfa, disked fields, and fallow fields are preferred foraging habitats within the Central Valley. Suitable nesting habitat appears to exist but the site is on the fringe of the local nesting range. None have been observed during the surveys.

Western yellow-billed cuckoo. Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) is a state-listed endangered species. Typical habitat includes dense riparian thicket/woodland. This migratory species arrives from its wintering grounds in South America during June and departs from California during September. In northern California, current nesting populations occur along the upper Sacramento River (Tehama, Butte, Colusa, Glenn and Sutter County), Feather River, and the Butte Sink (Sutter and Butte County). Nesting potential is very low. None have been observed during the surveys.

Bank swallow. Bank swallow (*Riparia riparia*) is a state-listed threatened species and has no federal special-status. This species occurs along rivers and creeks where exposed vertical banks are utilized for nesting. Burrows are typically excavated in steep banks that have friable soils. Nesting occurs during May through July. A bank swallow colony (approximately 25 nesting pairs) was observed during a June 2000 field visit. A field visit in late July revealed that the birds had departed the area. The colony is/was located on the north side of the Bear River in the northeast quarter of the northwest quarter of Section 31, Township 14 N, and Range 6 E (39° 01' 31" N 121° 21' 09" W) (Figure 3).

Yellow warbler. Yellow warbler (*Dendroica petechia*) is a California Department of Fish and Game species of special concern. Yellow warblers nest in a variety of habitats, but the common denominator is wet riparian thickets including willows and blackberry tangles. Nesting habitat exists in a few locations where riparian vegetation is dense. None were observed during the surveys.

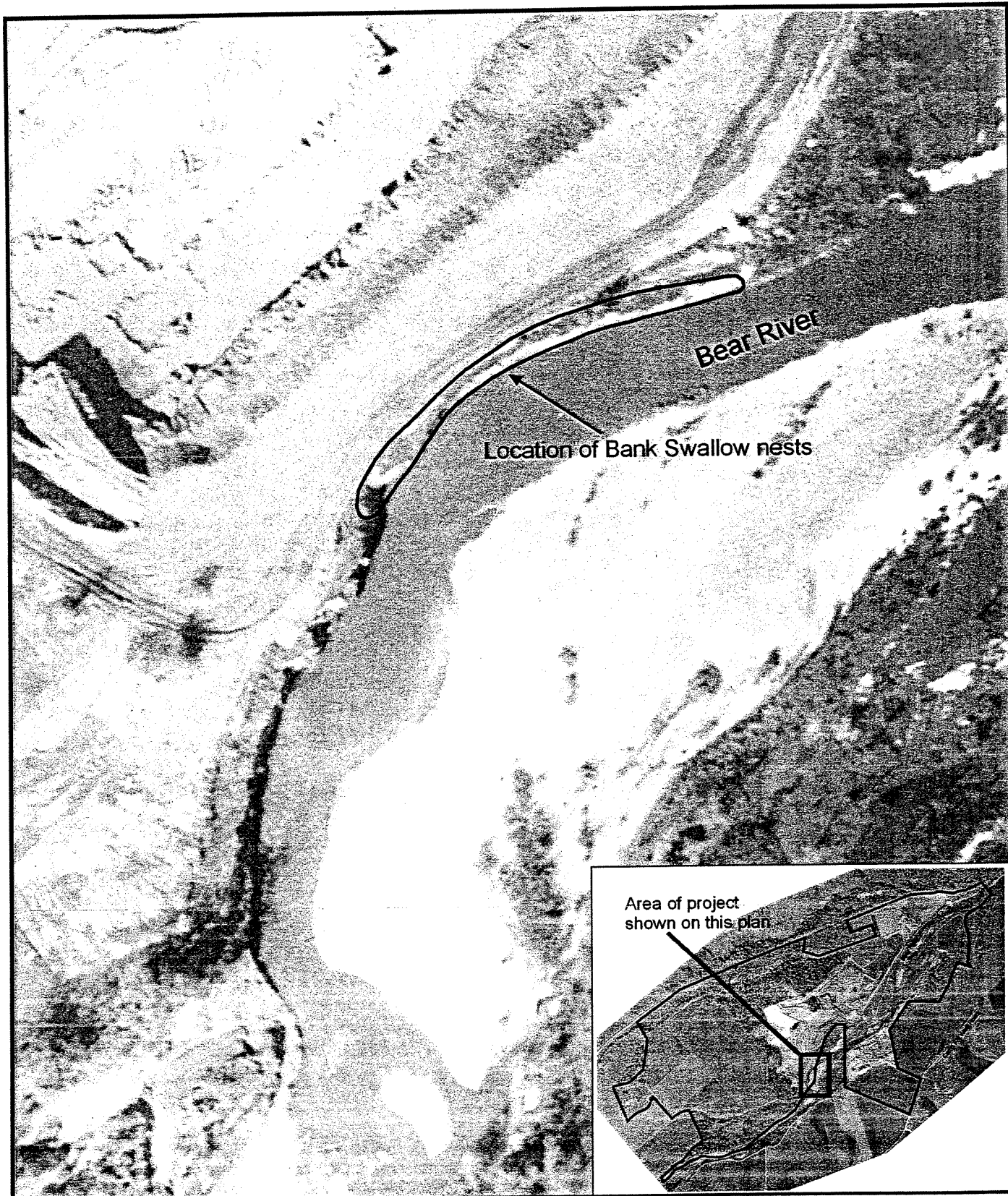
Yellow-breasted chat. Yellow-breasted chat (*Icteria virens*) is a California Department of Fish and Game species of special concern. Yellow-breasted chat nest in North America and winter in Mexico and Guatemala. This warbler typically nests within thick riparian scrub habitat in lower to middle elevations. Nesting occurs during May through August. Nesting occurs during May through August. Nesting habitat exists in a few locations where riparian vegetation is dense. None were observed during the surveys.

Tricolored blackbird. Tricolored blackbird (*Agelaius tricolor*) is a California Department of Fish and Game species of special concern. This colonial nesting species is distributed widely throughout the Central Valley and Coast Range. Suitable nesting habitat includes emergent marsh, willow thickets, blackberry thickets, and tall herbs. Open grassland and agricultural fields are characteristic foraging areas. Nesting occurs during April through July. Potential nesting habitat on the project site is marginal due to the lack of water. None were observed during the surveys.

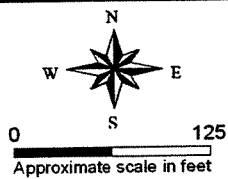
## CONCLUSIONS

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The Patterson Sand and Gravel/Damon Orchard Expansion project site has been evaluated for habitat types, special status species, and wetlands. Three habitat types have been identified; oak woodland, annual grassland, and riparian woodland. The most common tree species in the oak woodland is valley oak. Interior live oak, foothill pine, California black walnut, and cottonwood are also well represented. The annual grassland is dominated by typical non-native species such as ripgut brome, soft chess, rose clover, and telegraph weed. One area of riparian woodland (non-wetland) exists along the northern boundary of the southern parcel.



north  
fork  
associates



Photograph Date: 1-27-2000 by Towill, Inc.  
Project Number: 1391

Figure 3

**BANK SWALLOW NESTING AREA**

June 2000

*Patterson Sand and Gravel*  
Placer and Yuba Counties, California

This woodland contains many large cottonwood trees and few oaks. The subcanopy and shrub layers are dominated by willow and Himalayan blackberry.

Based on the criteria outlined in this document, the site provides potential habitat for thirteen special-status species including one plant species, one invertebrate species, and eleven bird species (see Table 2). Slightly less than one-half of approximately 400 elderberry plants are located in proposed preserve areas. Elderberry shrubs with stems greater than one inch in diameter at ground level are considered habitat for the federally threatened Valley elderberry longhorn beetle.

A bank swallow colony was located during early summer 2000 surveys. The colony occurs along the eroding banks of the Bear River and was estimated at approximately 25 nesting pairs.

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**Appendix A**  
**Plant Species Observed on the**  
**Patterson Sand and Gravel/Damon Estate Project Site**  
**August 1996-July 2000**

Scientific Name	Common Name
<i>Aegilops triuncialis</i>	Barbed goatgrass
<i>Aesculus californica</i>	California buckeye
<i>Ailanthus altissima</i>	Tree-of-heaven
<i>Aira caryophylla</i>	Hairgrass
<i>Alnus rhombifolia</i>	White alder
<i>Amaranthus blitoides</i>	Prostrate amaranth
<i>Ambrosia psilostachya</i>	Naked-spike ragweed
<i>Amsinckia menziesii</i>	Rancher's fireweed
<i>Anagallis arvensis</i>	Scarlet pimpernel
<i>Arctostaphylos viscida</i>	White leaf manzanita
<i>Aristolochia californica</i>	Pipevine
<i>Artemisia douglasiana</i>	Mugwort
<i>Asclepias speciosa</i>	Showy milkweed
<i>Asparagus officinalis</i>	Asparagus
<i>Avena barbata</i>	Slender wild oat
<i>Baccharis pilularis</i>	Coyote bush
<i>Baccharis salicifolia</i>	Sticky false-willow
<i>Brassica nigra</i>	Black mustard
<i>Brickellia californica</i>	Brickellbush
<i>Brodiaea elegans</i>	Elegant brodiaea
<i>Brodiaea species</i>	Brodiaea
<i>Bromus diandrus</i>	Ripgut brome
<i>Bromus hordeaceus</i>	Soft brome
<i>Bromus madritensis</i>	Red brome
<i>Carex barbarae</i>	Santa barbara sedge
<i>Carex species</i>	Sedge
<i>Ceanothus cuneatus</i>	Buck brush
<i>Centaurea solstitialis</i>	Yellow star thistle
<i>Centaureum venustum</i>	Charming centaury
<i>Cephalanthus occidentalis</i>	Common buttonbush
<i>Cerastium glomeratum</i>	Mouseear chickweed
<i>Cercis occidentalis</i>	Western redbud
<i>Chamomilla suaveolens</i>	Pineapple weed
<i>Chenopodium album</i>	Pigweed
<i>Chenopodium ambrosioides</i>	American wormseed
<i>Chlorogalum pomeridianum</i>	Large soap plant
<i>Cichorium intybus</i>	Chicory
<i>Cirsium vulgare</i>	Bull thistle
<i>Clarkia species</i>	Clarkia
<i>Claytonia perfoliata</i>	Miner's lettuce
<i>Convolvulus arvensis</i>	Morning glory

*Conyza canadensis*  
*Cynodon dactylon*  
*Cynosurus echinatus*  
*Cyperus eragrostis*  
*Cyperus species*  
*Dichelostemma capitatum*  
*Dichelostemma multiflorum*  
*Echinochloa crusgalli*  
*Epilobium brachycarpum*  
*Equisetum species*  
*Eremocarpus setigerus*  
*Eriodictyon californicum*  
*Erodium botrys*  
*Eschscholzia californica*  
*Ficus carica*  
*Fraxinus latifolia*  
*Galium species*  
*Geranium molle*  
*Hemizonia fitchii*  
*Heteromeles arbutifolia*  
*Heterotheca grandiflora*  
*Holocarpha virgata*  
*Hordeum marinum*  
*Hordeum murinum*  
*Hypericum perforatum*  
*Hypochaeris glabra*  
*Juglans californica*  
*Juncus balticus*  
*Juncus bufonius*  
*Lactuca serriola*  
*Lamium amplexicaule*  
*Leontodon taraxacoides*  
*Lolium perenne*  
*Lotus purshianus*  
*Lupinus bicolor*  
*Madia anomala*  
*Marrubium vulgare*  
*Medicago polymorpha*  
*Melilotus alba*  
*Mollugo verticillata*  
*Muhlenbergia rigens*  
*Myosurus minimus*  
*Paspalum dilatatum*  
*Petrorhagia dubia*  
*Phalaris species*  
*Phoradendron macrophyllum*  
*Phoradendron villosum*  
*Pinus ponderosa*

Canada horseweed  
 Bermuda grass  
 Dogtail grass  
 Tall flatsedge  
 Flatsedge  
 Blue dicks  
 Wild hyacinth  
 Barnyard grass  
 Panicked willow-herb  
 Horsetail  
 Turkey mullein  
 Yerba santa  
 Filaree  
 California poppy  
 Fig  
 Oregon ash  
 Bedstraw  
 Hairy geranium  
 Fitch's spikeweed  
 Toyon  
 Telegraph weed  
 Sticky tarweed  
 Mediterranean barley  
 Barley  
 Klamath weed  
 Smooth cat's-ear  
 California black walnut  
 Baltic rush  
 Toad rush  
 Prickly lettuce  
 Henbit  
 Hairy hawkbit  
 Perennial ryegrass  
 Bird-foot trefoil  
 Bicolored lupine  
 White tarweed  
 Common horehound  
 Bur clover  
 White sweetclover  
 Indian chickweed  
 Deergrass  
 Tiny mouse-tail  
 Dallisgrass  
 Petrorhagia  
 Canary grass  
 Big leaf mistletoe  
 Oak mistletoe  
 Ponderosa pine

*Pinus sabiniana*  
*Plantago lanceolata*  
*Poa annua*  
*Populus fremontii*  
*Quercus lobata*  
*Quercus wislizenii*  
*Raphanus sativus*  
*Rhamnus californica*  
*Robinia pseudoacacia*  
*Rosa californica*  
*Rubus discolor*  
*Rubus ursinus*  
*Rumex acetosella*  
*Rumex crispus*  
*Rumex pulcher*  
*Salix exigua*  
*Salix gooddingii*  
*Salix lasiolepis*  
*Sambucus mexicana*  
*Senecio vulgaris*  
*Sorghum halepense*  
*Stellaria media*  
*Taeniatherum caput-medusae*  
*Torilis arvensis*  
*Toxicodendron diversilobum*  
*Tribulus terrestris*  
*Trichostema lanceolatum*  
*Trifolium hirtum*  
*Trifolium species*  
*Urtica dioica*  
*Verbascum blattaria*  
*Verbascum thapsus*  
*Verbena bonariensis*  
*Vicia species*  
*Vicia villosa*  
*Vitis californica*

Foothill pine  
 English plantain  
 Annual bluegrass  
 Fremont cottonwood  
 Valley oak  
 Interior live oak  
 Wild radish  
 Coffeeberry  
 Black locust  
 California rose  
 Himalaya blackberry  
 California blackberry  
 Sheep sorrel  
 Curly dock  
 Fiddle dock  
 Sandbar willow  
 Goodding's willow  
 Arroyo willow  
 Mexican elderberry  
 Common groundsel  
 Johnson grass  
 Common chickweed  
 Medusahead grass  
 Hedge parsley  
 Poison oak  
 Puncture vine  
 Vinegar weed  
 Rose clover  
 Clover  
 Stinging nettle  
 Moth mullein  
 Common mullein  
 South American vervain  
 Vetch  
 Winter vetch  
 California wild grape



**Appendix B**  
**Animal Species Observed on the**  
**Patterson Sand and Gravel/Damon Estate Project Site**  
**August 1996-July 2000**

**Reptiles**

Gopher snake  
Southern alligator lizard  
Western fence lizard  
Western skink

*Pituophus catenifer*  
*Gerrhonotus multicarinatus*  
*Sceloporus occidentalis*  
*Eumeces skiltonianus*

**Mammals**

Black-tailed jackrabbit  
California ground squirrel  
Coyote  
Mule deer

*Lepus californicus*  
*Spermophilus beecheyi*  
*Canis latrans*  
*Odocoileus hemionus*

**Birds**

American crow  
American goldfinch  
American kestrel  
Anna's hummingbird  
Bank swallow  
Bewick's wren  
Brewer's blackbird  
Brown-headed cowbird  
Bushtit  
California quail  
Cooper's hawk  
European starling  
Great horned owl  
House finch  
House sparrow  
Killdeer  
Mourning dove  
Northern mockingbird  
Northern flicker  
Nuttall's woodpecker  
Red-shouldered hawk  
Red-tailed hawk  
Ring-necked pheasant  
Ruby-crowned kinglet  
Rufous-sided towhee  
Scrub jay  
Turkey vulture  
Western bluebird  
Western kingbird  
Western meadowlark  
Wild turkey

*Corvus brachyrhynchos*  
*Carduelis tristis*  
*Falco sparverius*  
*Calypte anna*  
*Riparia riparia*  
*Thryomanes bewickii*  
*Euphagus cyanocephalus*  
*Molothrus ater*  
*Psaltiriparus minimus*  
*Callipepla californica*  
*Accipiter cooperii*  
*Sturnus vulgaris*  
*Bubo virginianus*  
*Carpodacus mexicanus*  
*Passer domesticus*  
*Charadrius vociferus*  
*Zenaida macroura*  
*Mimus polyglottos*  
*Colaptes auratus*  
*Picoides nuttallii*  
*Buteo lineatus*  
*Buteo jamaicensis*  
*Phasianus colchicus*  
*Regulus calendula*  
*Pipilo erythrophthalmus*  
*Aphelocoma caerulescens*  
*Cathartes aura*  
*Sialia mexicana*  
*Tyrannus verticalis*  
*Sturnella neglecta*  
*Meleagris gallopavo*

**PATTERSON SAND & GRAVEL  
REVISED  
BIOLOGICAL MITIGATION PLAN  
Placer and Yuba Counties, California**

*Prepared For:*

Patterson Sand & Gravel  
PO Box 12  
Sheridan, California 95681  
(530) 633-2232

*Prepared By:*



457 Grass Valley Highway, Suite 12  
Auburn, California 95603  
(530) 887-8500

April 2001

**PATTERSON SAND & GRAVEL  
REVISED BIOLOGICAL MITIGATION PLAN**

**APRIL 2001**

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# **PATTERSON SAND & GRAVEL REVISED BIOLOGICAL MITIGATION PLAN**

**April 18, 2001**

## **INTRODUCTION**

---

Patterson Sand and Gravel proposes to conduct an expanded phased excavation for production of sand and gravel on an 884 acre site along the Bear River in Placer and Yuba Counties, California. Approximately 365 acres are included in the expansion area, in addition to 326 acres currently authorized for mining under existing permits. The remaining 193 acres of the site will be preserved.

The mining will be conducted in phases. Phase 1 is currently being mined under existing permits. Six additional phases (for a total of seven) are planned over the next sixty years. Mined aggregate will be processed onsite and trucked offsite. Sand and gravel mining is expected to take place through year 2060.

North Fork Associates has assisted Patterson Sand & Gravel and Carlton Engineering in the development of a conceptual Biological Mitigation Plan for the proposed mine expansion area.

The intent of this plan is to establish the mitigation framework for the ongoing reclamation of the site and to provide the basic mitigation/reclamation program for analysis in the EIR. Reclamation will occur concurrent with mining activities. The second (future) component of this plan would include a specific mitigation program for each phase detailing all specific issues necessary to carry out the program. Details will include specific plant palette, irrigation detail, planting timing and technique, etc.

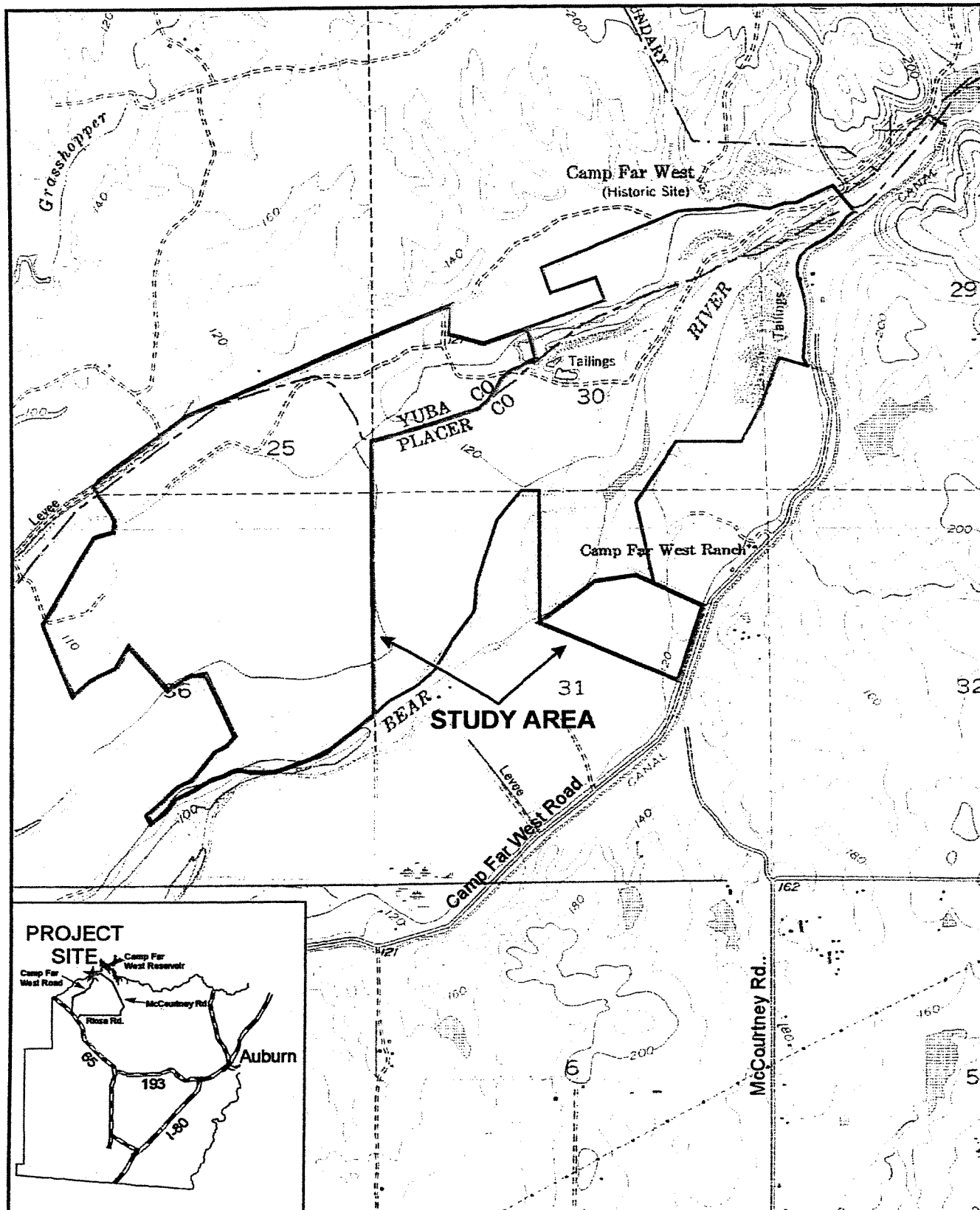
## **PROJECT AREA**

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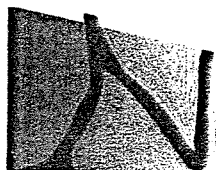
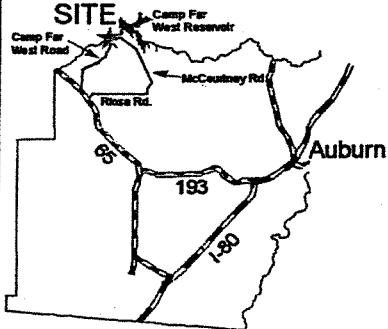
The project site is located north and south of the Bear River, in its historic floodplain. All current and proposed mining will occur outside of waters of the United States (above the ordinary high water mark) (Figure 1).

The entire area contains deep, coarse soils, primarily sand and larger grained material. In the nineteenth century, placer mining in the Sierra Nevada Mountains washed a huge amount of sediment down the Bear River drainage, leaving deep deposits in the project area. Since Camp Far West Dam was constructed in 1962, periodic high flood flows were reduced which in turn effectively squeezed the river into a narrower corridor. Highest release out of Camp Far West during the January 1997 floods was approximately 34,000 cubic feet per second. These flows were relatively contained and the riverbed maintained its current location.

The project area is located on a high bench adjacent to the river. The river elevation is approximately 91 feet above sea level and the relatively flat adjoining bench, currently supporting oak woodland and walnut orchard, is approximately 113 feet above sea level.



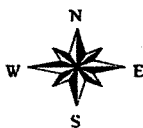
**PROJECT SITE**



north  
fork  
associates

0 1000 2000

Approximate scale in feet



Camp Far West USGS 7.5 minute  
topographic quadrangle

**Figure 1**

**VICINITY AND  
LOCATION MAP**

*Patterson Sand and Gravel*  
Placer and Yuba Counties, California

The deep coarse soils of the floodplain support annual grassland and oak woodland vegetation. Valley oak is the most common tree species. Shrubs are also abundant in many areas. The project area contains elderberry shrubs. The habitat types in the expansion area are described briefly below and in more detail in the Biological Resources Assessment Report, dated November 2000.

## **MITIGATION PLAN ELEMENTS**

---

The basic concept of the proposed mitigation plan is to create a valley oak-riparian woodland along the Bear River concurrent with mining. Compensation for impacts to existing habitats will be implemented incrementally about 1.5 years in advance of actual impacts. It is probable that valley oak woodland was the primary habitat type in the area now actively mined. The reclaimed habitat will consist predominately of valley oak but contain numerous native associate species, including interior live oak, foothill pine, cottonwood, white alder, Oregon ash, and other riparian components. A large elderberry mitigation area will be established in the early phase of the reclamation.

A mosaic of habitat types will be created along the edge of the reclaimed mined areas to provide variable landforms and plant and wildlife habitat. These reclaimed habitats were designed to enhance the future habitat values of the Bear River corridor by creating foraging, nesting, resting, and escape cover for waterfowl and non-game wildlife. The created habitats will include open water, emergent marsh, riparian, elderberry, oak woodland and oak savanna habitat, and will feature a combination of benches and terraces, gradual slopes, an irregular shoreline with shallow inlets, and steep faces. Mined slopes will be reclaimed and habitat created concurrent with mining activity.

Habitat zones will be based on plant rooting depths to the seasonally fluctuating groundwater table. Benches, terraces, and gradual slopes will be constructed at variable elevations within the range of mean winter and summer groundwater levels in areas with suitable surface water and groundwater hydrology to support emergent marsh or riparian plant communities. Habitat zones have been designed to encourage natural, sustainable vegetation that will not require supplemental irrigation. Pilot plantings of various native species will be installed to increase revegetation and colonization rates and to promote species diversity. Upland slopes and terraces will be planted with woody native species or seeded with an appropriate native and naturalized grassland seed mix. The elevation of habitat benches and terraces has been set within a range of suitable hydrologic conditions for specific habitat types, based on estimated groundwater levels.

The mitigation program creates a habitat corridor where none currently exists. It maintains the linkage between the Southern and Central Preservation Areas by preserving a minimum 100-foot corridor of mature oak woodland habitat. New corridors will be created as the reclamation proceeds.

## **HABITATS**

---

### **Oak Woodland**

Most of the oak woodland areas are dominated by valley oak. Drier locations well away from the river support interior live oak, while areas nearer the river support non-oak species including California black walnut, cottonwood, and tree of heaven. The oak woodland areas also support many shrub species including poison oak, Himalayan and California blackberry, California buckeye, white leaf manzanita, elderberry, buck brush, coyote bush, and coffeeberry.

### **Oak Savanna**

The oak savanna is typified by the dominance of non-native grass species, and many non-native non-grass species. Woody vegetation is lacking to sparse. Trees and shrubs are scattered throughout the grassland but do not occur in large enough numbers to be considered a woodland. Yellow star thistle, wild oat, ripgut brome, rose clover, tarweed, telegraph weed, hedge parsley, and filaree are among the most common species in this habitat.

### **Riparian Woodland**

One area on the project site is mapped as riparian woodland and is located approximately 600 feet north of the Bear River (along an abandoned ditch and the southern boundary of the large walnut orchard). It occupies approximately 3 acres. Plant species common to this non-wetland riparian area include cottonwood and black locust in the tree stratum, willow in the subcanopy stratum, Himalayan blackberry in the shrub stratum, and mugwort in the herbaceous stratum. The herb layer is not well represented due to the high shrub cover.

### **Agriculture**

In addition to impacts to the 3 habitats listed above, 261 acres of agricultural use (walnut orchard and rice) will be removed, mined and approximately 255 acres reclaimed to agriculture. No specific recommendations for agriculture reclamation are included in this plan.

## **PRESERVATION AREAS**

---

Four preservation areas, totaling one-hundred ninety-three acres, will be maintained throughout the mining operation, including three oak woodlands and the Bear River corridor. The 3 oak woodlands, called "North Preservation Area," "Central Preservation Area," and "South Preservation Area," support relatively dense stands of mature oaks. Valley oak is the most abundant but interior live oak is common in the Central Preserve. The preservation corridor along the Bear River, called the "Bear River Preservation Corridor," consists of lands within the leveed floodplain of the Bear River. These lands are variable, but are generally open and lack dense stands of woody vegetation. Table 1 indicates the acreage of each preservation area.

---

**Table 1. Preservation Areas.**

---

Preservation Area	Acreage
North Preservation Area	11
Central Preservation Area	29
South Preservation Area	43
Bear River Preservation Corridor	110
<b>Total</b>	<b>193</b>

### **Preserve/Enhancement Area**

The northern portion of Phase 6 currently is slated for mining and reclamation to agriculture between years 2054 to 2056. This area contains remnant wetlands from former mining operations and an upland, open scraped area. The area is adjacent to the river on the land side of the levee. Depending on final configuration and need to reclaim to agriculture, this area (22 acres) would be appropriate to leave as is or, through enhancement measures, improve its quality. Because it is located along the river, it would add to the Bear River Preservation Corridor and the goal of improving the habitat quality of the river corridor. Flat upland areas on the parcel could provide habitat mitigation opportunity and may be considered for this function. The area is depicted on both Figures 2 and 3.

### **HABITAT IMPACTS**

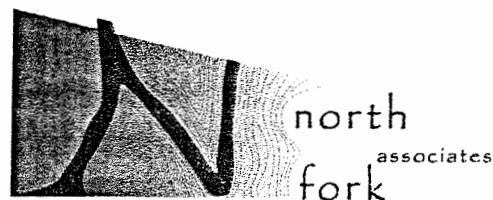
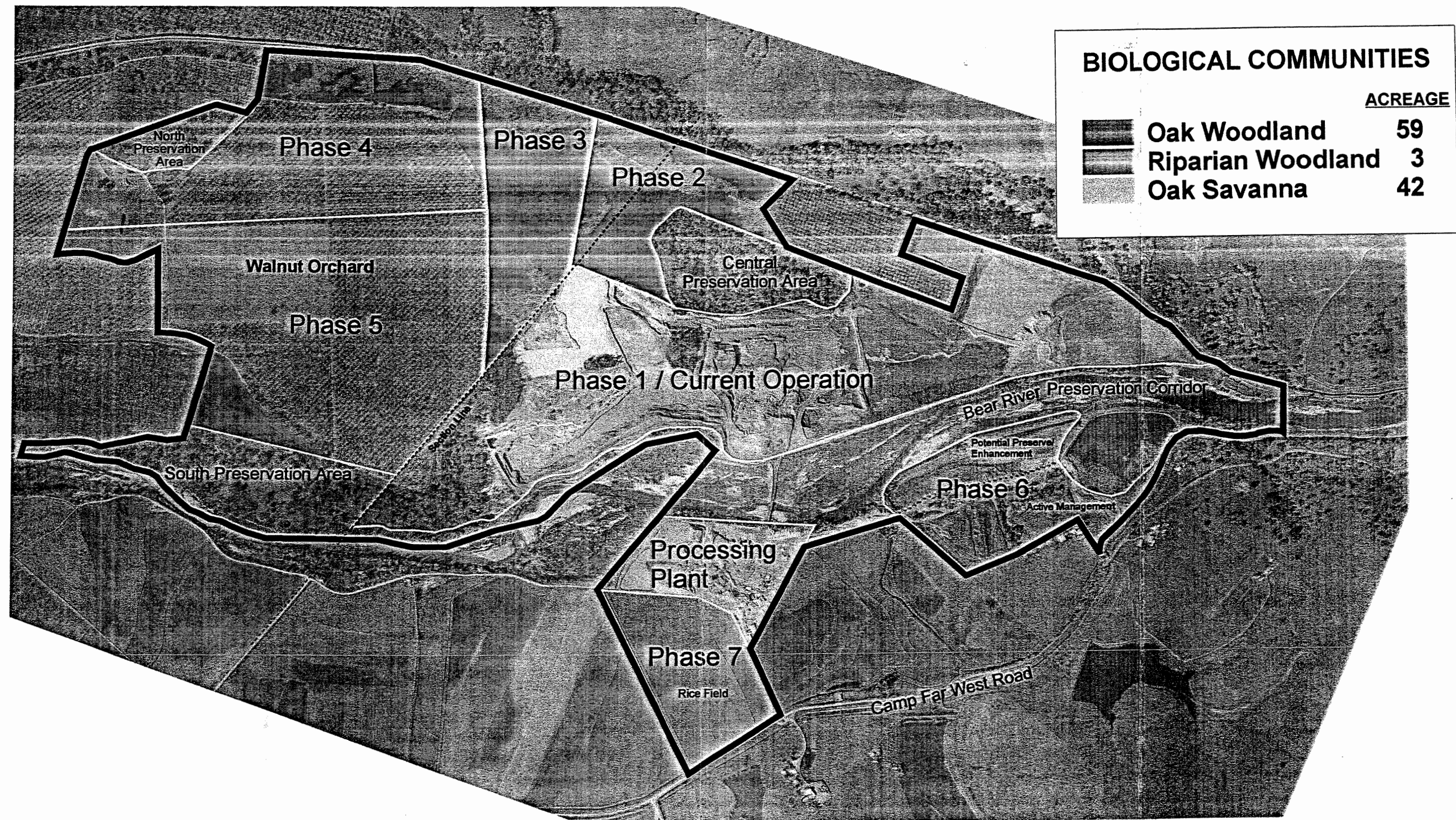
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Three primary natural habitat types will be affected by the proposed mining expansion (Figure 2). These habitats and their existing acreages within the expansion area include:

- Oak woodland (142 acres)
- Oak savanna (42 acres)
- Riparian woodland (3 acres)

For each phase of the expansion area, the number of elderberry plants, approximate number of oak trees, and habitat type were enumerated. Table 2 summarizes impacts to each habitat type, including elderberries, for each phase.





**Notes:**  
 1. Approximately 269 acres of agricultural lands will be mined.  
 2. Preservation areas will not be mined.

0 1000  
 Approximate Scale in Feet

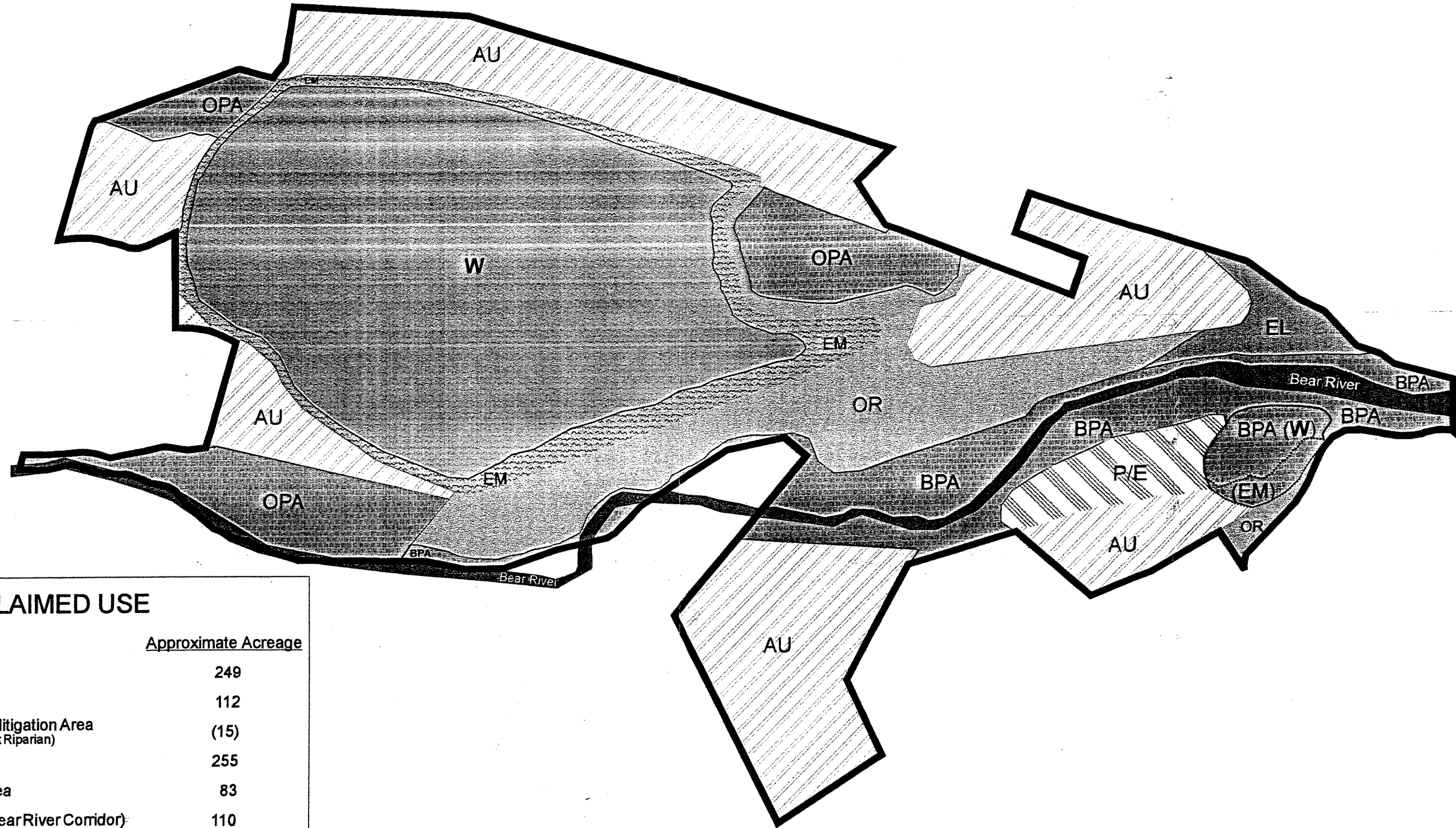


Photograph Date: 1-27-2000 by Towill, Inc.  
 Map Date: April 2001

Figure 2

**EXPANSION AREA HABITAT  
 IMPACT MAP WITH PHASING**  
*Patterson Sand and Gravel*  
 Placer and Yuba Counties, California





## RECLAIMED USE

### Approximate Acreage

<b>W</b>	Open Water	249
<b>OR</b>	Oak Riparian	112
<b>EL</b>	Elderberry Mitigation Area (included in Oak Riparian)	(15)
<b>AU</b>	Agricultural Use	255
<b>OPA</b>	Oak Preservation Area	83
<b>BPA</b>	Preservation Area (Bear River Corridor)	110
<b>EM</b>	Emergent Marsh	53
<b>P/E</b>	Potential Preserve/Enhancement Area	22



0 1000  
Approximate Scale in Feet

April 2001

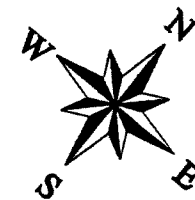


Figure 3

**FINAL RECLAMATION PLAN  
BIOLOGICAL COMPONENTS**  
*Patterson Sand and Gravel*  
Placer and Yuba Counties, California

**Table 2. Habitat and Elderberry Impacts for each Phase.**

Phase	Elderberry Impacts	Oak Tree Impacts	Oak Woodland Impacts	Oak Savanna Impacts	Riparian Woodland Impacts
1	141	Permitted	Permitted	Permitted	0ac
2	29	718	23ac	16ac	0ac
3	8	1110	27ac	13ac	0ac
4	13	502	2ac	13ac	0ac
5	29	267	7ac	0ac	3ac
6	8	Permitted	Permitted	Permitted	0ac
7	0	0	0ac	0ac	0ac
Totals	228	±2597	59ac	42ac	3ac

Over 400 elderberry plants occur on the project site. Impacts to 228 elderberry plants are proposed through the 7 phases (about 58% impact of existing elderberry shrubs on site).

Although all oak trees on the project site were not counted, the majority are preserved through Oak Tree Preservation Areas and the Bear River Preservation Corridor.

#### **COMPENSATION FOR HABITAT IMPACTS**

This biological mitigation plan has been developed to account for loss of habitat resulting from the proposed project. Proposed natural habitat mitigation/reclamation area will be generally located along the north side of the Bear River. Inclusive in the overall mitigation/reclamation area will be the North Preservation Area, the Central Preservation Area, the South Preservation Area, and the Bear River Preservation Corridor.

Compensation for impacts to the 3 habitat types will occur in advance of the actual impacts. In general, the habitat will be constructed 1.5 years in advance of impact. This will lessen the temporal loss effect and insure continuous attention to habitat reconstruction. Table 3 indicates each natural habitat to be constructed and its associated acreage.

**Table 3. Mitigation Components and Associated Acreage for each Habitat.**

Habitat Type	Impacted Acreage	Mitigation Acreage
Oak Woodland/Savanna/Riparian	59/42/3	112
-Elderberry Habitat (included in above)	scattered	(15)
Emergent Marsh	0	53
Open Water	0	249
Oak Preservation Areas	0	83
Bear River Preservation Corridor	0	110
Potential Preserve/Enhancement Area	0	22

The mitigation area will be established along the Bear River in areas currently unvegetated. A key concept of the mitigation plan is to reestablish a contiguous variable vegetated corridor along the Bear River. It is anticipated this corridor will create wildlife habitat and improve water quality runoff as it filters to the Bear River.

### **Oak Woodland/Riparian and Oak Savanna**

One hundred four acres of Oak Woodland, Oak Savanna, and Riparian Woodland that will be impacted will be compensated for by providing seventy-six acres of riparian Oak Woodland and thirty-six acres of riparian Oak Savanna habitat. This 112-acre "Oak Riparian" planting area includes 15 acres of Elderberry Habitat with oaks and other native species interspersed (Figure 3). Oak trees will be planted on 30-foot centers (average) in the oak woodland and 75-foot centers in the oak savanna. The different planting densities will be located and determined upon final site planning, based on the final landform.

Using these densities, approximately 4000 replacement oak trees will be planted on 112 acres. The estimated number of oak tree impacts is 2600 trees (Table 2). This makes the mitigation ratio for oak trees about 1.5:1. The total oak woodland/oak savanna/riparian woodland impact acreage is 104 acres and the total oak planting area is 112 acres (more than a 1:1 acreage ratio).

Oak stock will be grown from local acorns. Acorns will be planted directly into the ground in the mitigation area when mitigation is in advance of schedule. That is, if an area is prepared for future mitigation but is not yet needed, the applicant has the option of direct acorn planting from locally collected acorns. When the time comes to mitigate for impacts, the biological monitor will assess the sapling crop and determine if the young trees are adequate for required mitigation. If so, these trees will be counted towards mitigation credit. If the number of young trees are too few, container grown plants will be added until the appropriate number is reached.

Oak trees, along with all other revegetation species, will be planted by skilled workers using standard technique. Most of the planted habitat will be irrigated by water trucks from the adjacent levee road. Irrigation will occur by drip tubing where water trucks cannot service.

### **Riparian Woodland**

Riparian woodland impacts are 3 acres. The 112 acre Oak Riparian mitigation area provides ample opportunity to increase this area substantially, which will improve overall habitat values of the river corridor. Riparian zones will occur where the water table is seasonally high. This condition is present primarily along the eastern end of the large lake, where final grade will be a very gradual slope, providing a water gradient that will support a wide range of species. At least six acres of riparian woodland will be constructed in the Oak Riparian mitigation area to compensate for three acres of impact (2:1 ratio).

### **Emergent Marsh**

Although there is no impact to existing emergent marsh habitat, an opportunity is provided to create approximately 53 acres along the permanently inundated zone of the lake margin. It will consist of a shallow submerged bench averaging not less than 20 feet wide. A relatively flat slope (e.g., 20:1) will occur as the oak/riparian woodland area slopes from east to west into the

lake. Vegetation will volunteer naturally due to favorable hydrologic, soil, and slope conditions.

### **Elderberry Habitat**

Elderberry habitat will be established in a 15-acre compensation area at the east end of the project area. Two hundred twenty-eight elderberry shrubs will be impacted by the proposed project (all seven phases). The elderberry mitigation habitat will be established following U. S. Fish and Wildlife Service guidelines (July 1999) and final permit requirements for this project.

### **Open Water**

A lake approximately 249 acres will be the end use in the western portion of the project site. The lake will have an average surface elevation of 95 feet. Emergent marsh described above will ring the lake.

## **PERFORMANCE STANDARDS**

---

Revegetation will occur continuously and at least 1.5 years in advance of mining operations for which the existing habitat will be removed. Compensation habitat will be established and maintained to insure that the appropriate number of trees and shrubs are being established, and that survivability is adequate to establish and maintain the target habitat.

Performance standards will be established for each habitat type being constructed.

### **Oak Woodland/Riparian**

- 70% survivability of trees planted on average 30' on center
- 50% survivability of native shrub species planted among oaks

### **Oak Savanna**

- 70% survivability of trees planted on average 75' on center
- 50% survivability of native shrub species planted among oaks

### **Riparian Woodland**

- Establishment of a minimum 6 acres of riparian woodland containing hydrophytic species in all strata (herb, shrub, sub-canopy and canopy)

### **Emergent Marsh**

- Establishment of emergent marsh vegetation along the lake fringe to an average width of at least 20' from the toe of the adjacent slope

### **Elderberry Habitat**

- Per permit guidelines set forth in the Conservation Guidelines for the Valley Elderberry Longhorn Beetle (USFWS 1999)

### **Open Water**

- Long term establishment of approximately 249 acres of open water

### **Preservation Areas**

- A conservation easement for each of the 4 preservation area shall be established

### **MONITORING PROGRAM**

---

An annual monitoring program will occur for a minimum of 5 years after each phase of planting.

### **ANNUAL REPORTS**

---

A Restoration Program monitoring report will be submitted to the County annually.



REPLY TO  
ATTENTION OF

DEPARTMENT OF THE ARMY  
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO  
CORPS OF ENGINEERS  
1325 J STREET  
SACRAMENTO, CALIFORNIA 95814-2922

May 30, 1997

Regulatory Branch (199600545)

Jeff Glazner  
Environmental Consulting  
710 High Street, Suite 207 C  
Auburn, California 95603

Dear Mr. Glazner:

This letter concerns your request, on behalf of Patterson Sand & Gravel, for a verification of your delineation of waters of the United States, including wetlands, within a portion of the Damon Estate. The surveyed areas are located in Sections 25 and 36, Township 14 North, Range 5 East and Section 30, Township 14 North, Range 6 East, MDBM, along the Bear River downstream from Camp Far West Reservoir, in Placer and Yuba Counties, California.

We have reviewed your October 30, 1996, letter as well as the mapping provided with your May 27, 1997, memorandum. Based on the information you have provided we concur with your conclusion that the site contains no wetlands. The Bear River to it's ordinary high water line is a water of the United States. Our jurisdiction in this area is under Section 404 of the Clean Water Act. A Department of the Army permit is required prior to discharging dredged or fill materials into waters of the United States. The type of permit required depends on the type and amount of waters which would be lost or adversely modified by fill activities.

A Section 404 permit will not be required for work within the areas you have shown as "proposed excavation" on the latest map, provided this work does not result in any discharges of dredged or fill material below the ordinary high water line of the Bear River. However, we strongly recommend that the project proponents contact the U.S. Fish and Wildlife Service regarding the effects of the proposed work on federally listed threatened or endangered species. We previously observed numerous mature Elderberry plants on the upstream terraces adjacent to this site and believe that they may be present within the surveyed areas.

This delineation verification is for Section 404 purposes only and is valid for five years from the date of this letter unless new information warrants revision of the determination before the expiration date. Please refer to identification number 199600545 in any correspondence concerning this project.



Thank you for your cooperation. If you have any questions, please write to Michael Finan, Room 1480 at the letterhead address, or telephone (916)557-5324.

Sincerely,

A handwritten signature in cursive script, appearing to read "Bob Junell".

Bob Junell  
Chief, Sacramento Valley Office

Copies Furnished:

Cliff Heitz, USDA Natural Resources Conservation Service, Auburn  
Field Office, 251 Auburn Ravine Road, Suite 201,  
Auburn, California 95603

Deblyn Mead, U.S. Fish and Wildlife Service, Endangered Species  
Division, 3310 El Camino Avenue, Suite 130,  
Sacramento, California 95821-6340

**EXPLORATORY DRILLING  
PATTERSON SAND AND GRAVEL  
8705 Camp Far West Road  
Sheridan, California**

**Raney Geotechnical Job No. 1542-001**

January 12, 1998

Patterson Sand and Gravel  
Attention: Darren Morehead  
8705 Camp Far West Road  
Sheridan, CA 95681

**EXPLORATORY DRILLING**  
**PATTERSON SAND AND GRAVEL**  
8705 Camp Far West Road  
Sheridan, California  
Job No. 1542-001

### INTRODUCTION

This firm has completed an exploratory drilling program within the unmined portion of the Patterson Camp Far West deposit. The purpose of this investigation has been to provide data for evaluation of the quantity and quality of the deposit.

Our work has included the logging of 12 exploratory borings to a maximum depth of 70 feet below existing grades. The borings were drilled with an AP1000 Becker Hammer drill rig provided by you; the rig employs a nine inch outer diameter, six inch inner diameter, dual walled reverse circulation drill system. Bulk disturbed samples were obtained from the borings for classification and laboratory testing. The boring and sampling locations are shown on an aerial photographic base on Plate 1, *Plot Plan*. The logs of the borings are presented on Plates 2 through 13, *Log of Boring*. The nomenclature used to describe the soils on the logs is defined on Plate 14, *Unified Soil Classification System*. Separate generalized soil profiles are shown on Plates 15 and 16, *Generalized Soil Profile, Sections A-A and B-B*, respectively. Grain size distribution tests were performed on selected gravel and sand samples; the results of these tests are presented on Plates 17 through 23, *Grain Size Distribution*. Two gravel specimens were tested for abrasion via Los Angeles Rattler; the results of these tests are presented on Plate 24, *LA Rattler Data*.

### HISTORY

We understand that aggregate mining operations have been performed on the Camp Far West site for approximately 20 years. Former aggregate mining operations in the Bear River flood plain took place as early as the 1940's. Operations to date at the present site have included about 35 acres and have extended to a maximum depth of about 40 feet. The depositional history of the site is unusual in that a significant fraction of the near-surface deposits are related to hydraulic mining within the

Bear River drainage prior to the turn of the century. We understand that you plan to mine within the approximate 215 acre remainder of the property as long as operations are economically justifiable.

## SITE CONDITIONS

### SURFACE

The site encompasses approximately 250 acres north of Camp Far West Road and along the Bear River. It would appear that most of the deposit is northerly of the present trace of the river; processing equipment, offices and maintenance facilities are to the south of the river. The property is generally bounded by rice-farmed land to the south and walnut orchards to the west and north. A concrete lined irrigation ditch and graveled road are present along the northern margin of the property. The westerly portions of the channel and road generally are contiguous with the crown of a levee. Ground surfaces northerly of the levee are on the order of ten to 15 feet below areas southerly of the drainage.

The entire property is within the Bear River flood plane. Ground surfaces on undisturbed portions of the site are relatively flat; topography to the north and south of the site includes gently rolling foothills. The site was surveyed to establish surface elevations at the locations of Borings 1 through 11. Boring elevations range from +112 to +121 feet USGS datum. Surface soils on undisturbed portions of the site are dominated by tan to white fine sands. Much of the site is moderately to densely wooded; vegetation includes mature pines, oaks, and various shrubs and vines.

Portions of the site are currently used for agriculture; walnut orchards are present on and/or near the site to the west and north.

### SUBSURFACE

The borings encountered varying soil and rock conditions. Borings 1 and 2 were performed in areas mined or being mined. The surface elevation at Boring 1 is +116 feet. Soils within Boring 1 included an approximate eight foot stratum of gray-brown fine sandy silt underlain by a layered gravel and cobble deposit intermixed with sands silts and clays from elevation +108 feet to elevation +66 feet, the maximum depth of exploration. The gravel materials observed in this boring were found to be similar to the materials being excavated within the nearby pit. Boring 2 was performed near the bottom of the current pit. The surface elevation at this location is +82 feet. Materials encountered in this boring include layered gravel and cobble deposits with some sand and clay intermixed to approximately elevation +55 feet. Below this level and extending to the +22 foot maximum depth explored, we observed dark gray to black silty and clayey fine sands with occasional clay lenses.

Borings 3 through 11 were performed within unmined areas. These borings generally encountered uniform subsurface conditions. The surface stratum within these borings included tan to white

slightly silty fine sands with minimal inclusions of fine gravel extending to depths of 13 to 18 feet. The bottom of this stratum ranges from +98 to +106 feet. Beneath the described uppermost stratum and extending to elevations ranging from +88 to +100 feet these borings encountered yellow-brown to brown silty clayey fine sands and fine sandy silts. Within this interval some borings encountered notable amounts of organic matter, particularly within the lower portions of the sandy silt materials. Underlying the described clayey sand/sandy silt interval, materials graded to include medium dense to dense, red-brown and yellow-brown layered fine to coarse gravels with varying amounts of sand, silt and clay. The gravels were observed to extend to the maximum depth of exploration in some of the borings, while in others layers of clay or sand appeared to define the lower boundary of the gravel materials. The lowest elevation at which gravel was observed was +51 feet in Boring 5.

Boring 12 is located on the northerly periphery of the flood plane and generally appears to engage materials similar to those found in Borings 3 through 11. The depth locations of the materials encountered in Boring 12, however, generally did not agree with the stratification within Borings 3 through 11. The ground surface elevation at Boring 12 was not measured. Surface soils in Boring 12 included loose white fine sands containing slightly more fine to medium gravel than observed in other borings; these materials are indicated to extend to a depth of about seven feet. A layer of red-brown fine sandy clay with fine to medium gravel was observed between depths of seven and 16 feet. Below a depth of 16 feet materials were observed to grade to medium dense to dense, and consisted of red-brown and yellow-brown layered fine to coarse gravels with varying amounts of sand, silt and clay. Underlying the described gravels, at a depth of approximately 51 feet, Boring 12 encountered hard, cemented blue-gray fine sandy clayey silts which extend to the 60 foot maximum depth of exploration. This cemented silt material was not observed in any other boring.

Groundwater was observed at various depths in the borings. In most instances where groundwater was encountered it was observed to be a confined feature. Groundwater was typically observed in sand and gravel strata with a lower boundary of relatively impervious clay. Borings 7 and 8 were performed between the walnut orchard on the westerly boundary and the irrigation channel to the north. In these borings groundwater was observed at elevations of approximately +91 and +92 feet, respectively, and extending to the maximum depth of exploration. It is likely that irrigation within the adjacent orchard has given rise to the high groundwater condition in these borings.

For a better understanding of subsurface conditions, reference should be made to the Logs of Boring and Generalized Soil Profiles.

## **LABORATORY TESTING**

### **GRAIN SIZE DISTRIBUTION**

Our work included the performance of grain size distribution testing on selected gravel and sand samples. Test samples were selected to represent the different gravel and sand materials engaged. The grain size data are presented on Plates 17 through 23.

### **RESISTANCE TO DEGRADATION**

Geologic conditions within the Bear River drainage upstream of the site are complex and heavily faulted. Conditions have been made more complex by the hydraulic mining within the watershed. This being the case, aggregates at the site contain varying rock materials, although differentiation of aggregate by rock type is unimportant provided the engineering properties are consistent. In this regard, the primary problem materials would appear to be serpentinized rock which is poorly indurated. The poorly indurated rock is infrequent, difficult to identify and random. In spite of these limitations we have attempted to identify zones of higher concentrations of poorly indurated rock.

Two gravel samples obtained from the site were selected for the ASTM C131 Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine (LA Rattler). Both samples contained minor amounts of poorly indurated rock as the test data indicate. The test data are presented on Plate 25.

According to the Annual Book of ASTM Standards the LA Rattler test is considered an indicator of the relative quality or competence of various sources of aggregate having similar mineral composition. We are not aware of any qualitative standards rating aggregates of dissimilar or varying mineral content. Our intent in performing the LA Rattler tests was to demonstrate the potential for wear or breakdown that can be expected from a sample that appeared to contain a higher concentration of poorly indurated rock than is typical of the site.

### **SUMMARY**

Approximate thicknesses of white sand, sound gravel, and gravel containing some weakly cemented rock at each boring location is summarized in Table I, Thicknesses of White Sand and Gravel. Average thicknesses of each material also are listed in Table I. Table II, Average Reserve Quantities, provides quantities based upon average thicknesses in Table I and the assumption that each boring represents an equal fraction of the remaining area to be mined. A more rigorous quantity determination could be made but is considered unwarranted on the basis of these data and is beyond our scope of work.

**TABLE I**  
**THICKNESSES OF WHITE SAND AND GRAVEL**

Boring #	White Fine Sand (feet)	Sound Gravel (feet)	Gravel Containing Some Weakly Cemented Rock (feet)
1	-	38	-
2	-	6	13
3	15	6	16
4	14	9	15
5	16	41	8
6	18	24	14
7	15	35	-
8	13	28	-
9	13	41	-
10	13	11	27
11	16	17	7
12	7	35	-
Average Thickness	14.0	24.3	14.3



**TABLE II**  
**AVERAGE RESERVE QUANTITIES**

	White Fine Sand	Sound Gravel	Gravel Containing Some Weakly Cemented Rock
Approximate Thickness of Material Band (feet)	14	24	14
Approximate Area Observed <sup>a/</sup>	10	12	7
Approximate Quantities (million cubic yards)	5	10	3.5

<sup>a/</sup> Approximate area determined by assuming that each boring represents the same fraction of the total area remaining to be mined (about 215 acres).

**LIMITATIONS**

The above summary data necessarily assume uniform variation of soils and rock between borings. Our calculations are based upon this assumed uniformity. This report is applicable only to the Patterson Sand and Gravel Camp Far West Pit and should not be used for evaluation of any other facilities or adjacent properties. Assumptions and calculations regarding site materials are not intended for application outside the site boundaries.

o0o

Patterson Sand & Gravel  
January 12, 1998  
Job No. 1542-001  
Page 7

The following Plates and Specifications are attached and complete this report.

Plate 1 - Plot Plan  
Plate 2 - Log of Boring, Boring 1  
Plate 3 - Log of Boring, Boring 2  
Plate 4 - Log of Boring, Boring 3  
Plate 5 - Log of Boring, Boring 4  
Plate 6 - Log of Boring, Boring 5  
Plate 7 - Log of Boring, Boring 6  
Plate 8 - Log of Boring, Boring 7  
Plate 9 - Log of Boring, Boring 8  
Plate 10 - Log of Boring, Boring 9  
Plate 11 - Log of Boring, Boring 10  
Plate 12 - Log of Boring, Boring 11  
Plate 13 - Log of Boring, Boring 12  
Plate 14 - Unified Soil Classification System  
Plate 15 - Generalized Soil Profile, Section A-A  
Plate 16 - Generalized Soil Profile, Section B-B  
Plates 17 through 23 - Grain Size Distribution  
Plate 24 - Resistance to Degradation

Sincerely,

RANEY GEOTECHNICAL

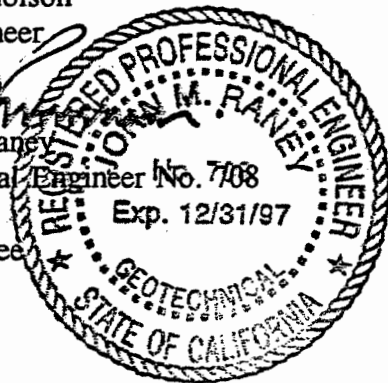


Darin Nicholson  
Staff Engineer



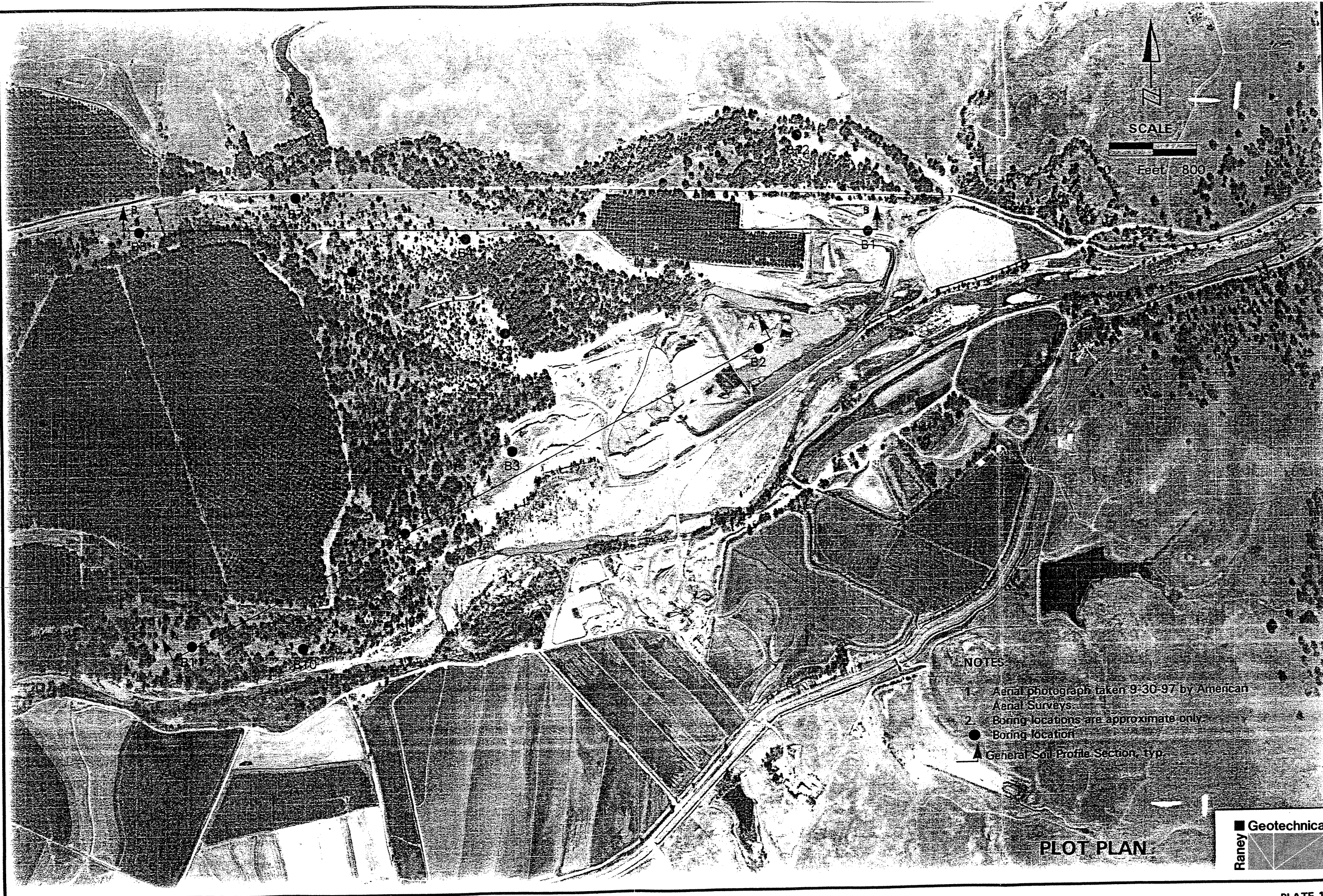
John M. Raney  
Geotechnical Engineer No. 7088

(5) addressee  
dn/jmr





PROJECT NUMBER: 1542-001  
DATE: \_\_\_\_\_  
DRAWN BY: \_\_\_\_\_  
CHECKED BY: \_\_\_\_\_  
PLATE NUMBER: 1



NOTES

1. Aerial photograph taken 9-30-97 by American Aerial Surveys.
  2. Boring locations are approximate only.
- Boring location
- ▲ General Soil Profile Section, typ.

PLOT PLAN



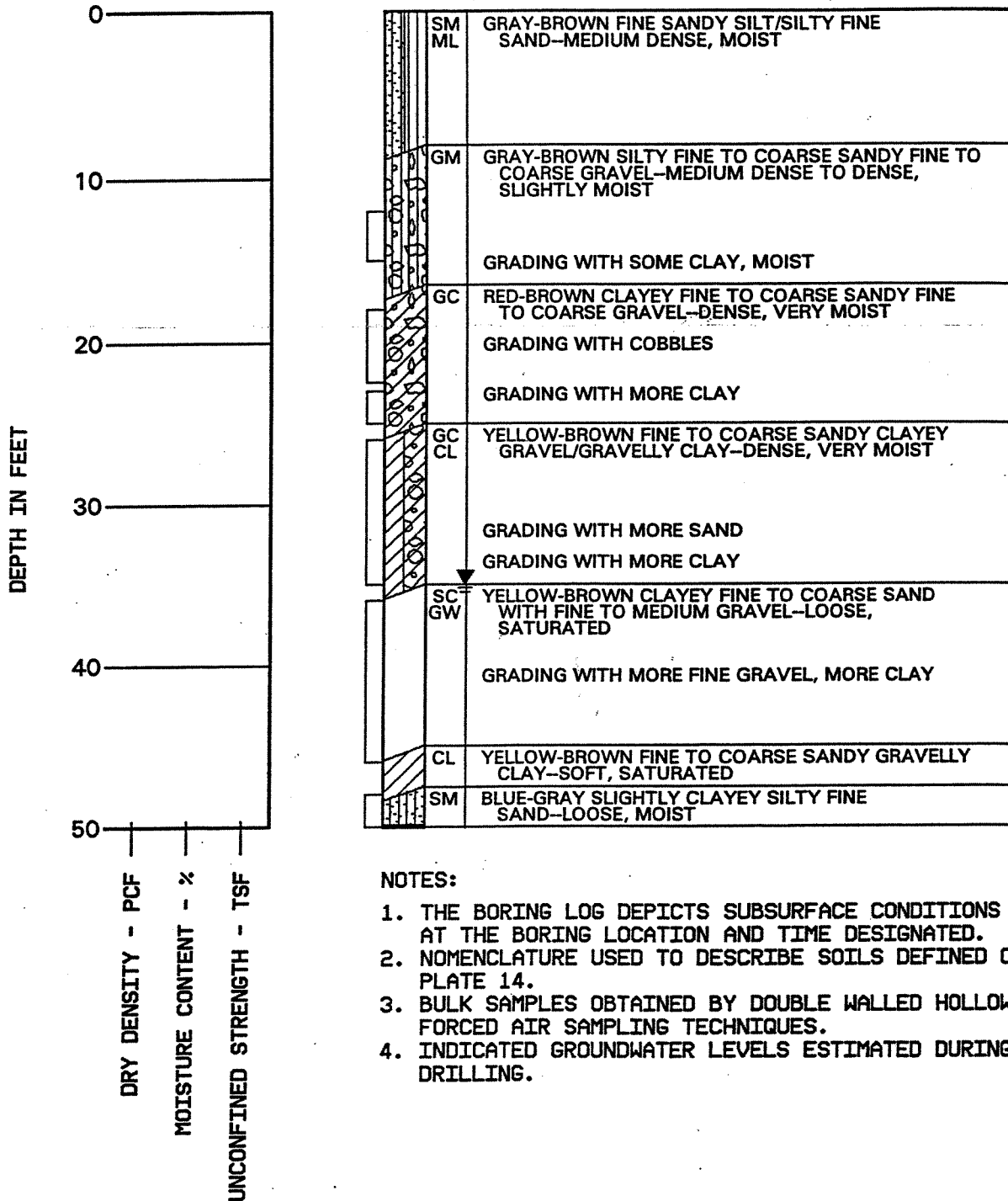


CHECKED BY: Donny DATE: 1/19/98  
 PLATE NUMBER: 2

# BORING 1

ELEVATION: 115.6 ± FEET

DRILLED: 8/18/97



## NOTES:

1. THE BORING LOG DEPICTS SUBSURFACE CONDITIONS ONLY AT THE BORING LOCATION AND TIME DESIGNATED.
2. NOMENCLATURE USED TO DESCRIBE SOILS DEFINED ON PLATE 14.
3. BULK SAMPLES OBTAINED BY DOUBLE WALLED HOLLOW TUBE FORCED AIR SAMPLING TECHNIQUES.
4. INDICATED GROUNDWATER LEVELS ESTIMATED DURING DRILLING.

LOG OF BORING

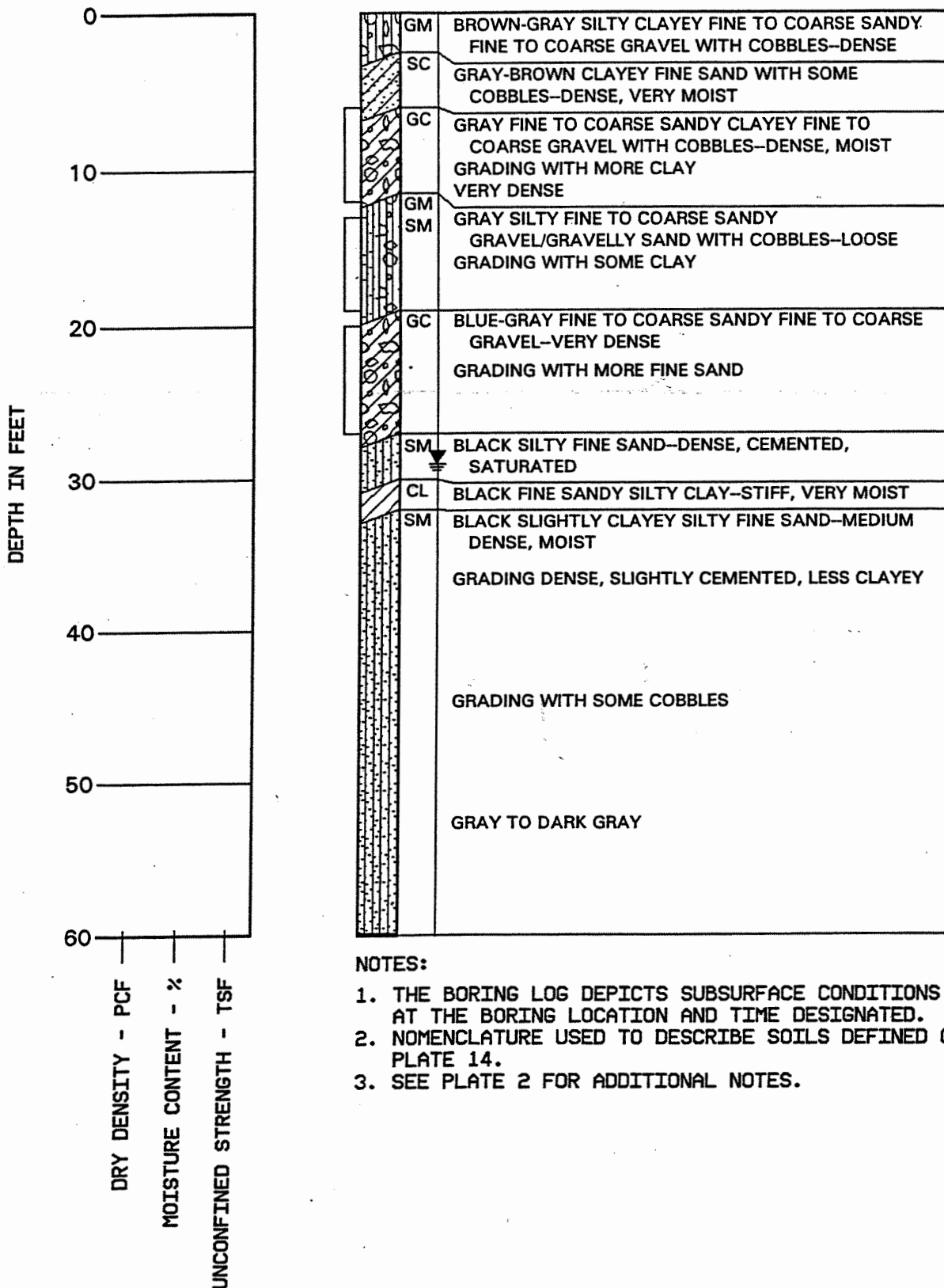


PLATE NUMBER: 3  
CHECKED BY: Penner DATE: 10/18/98

# BORING 2

ELEVATION: 81.9 ± FEET

DRILLED: 8/18/97



## NOTES:

1. THE BORING LOG DEPICTS SUBSURFACE CONDITIONS ONLY AT THE BORING LOCATION AND TIME DESIGNATED.
2. NOMENCLATURE USED TO DESCRIBE SOILS DEFINED ON PLATE 14.
3. SEE PLATE 2 FOR ADDITIONAL NOTES.

LOG OF BORING

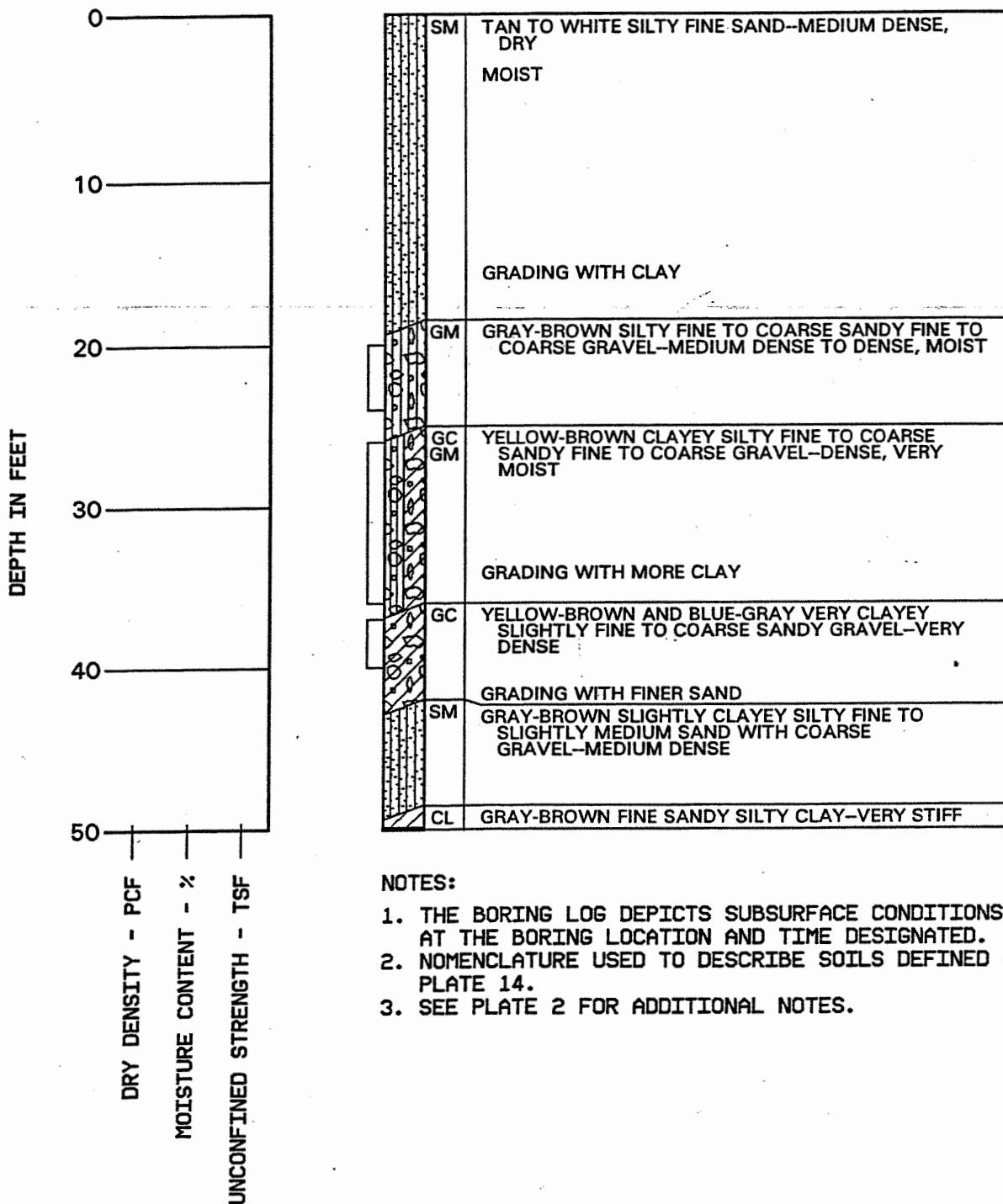


PROJECT NUMBER: 1342-001  
 DATE: 11/18/97  
 CHECKED BY: [Signature]  
 DATE: 11/18/97

## BORING 3

ELEVATION: 119.3 ± FEET

DRILLED: 8/18/97



### NOTES:

1. THE BORING LOG DEPICTS SUBSURFACE CONDITIONS ONLY AT THE BORING LOCATION AND TIME DESIGNATED.
2. NOMENCLATURE USED TO DESCRIBE SOILS DEFINED ON PLATE 14.
3. SEE PLATE 2 FOR ADDITIONAL NOTES.

LOG OF BORING

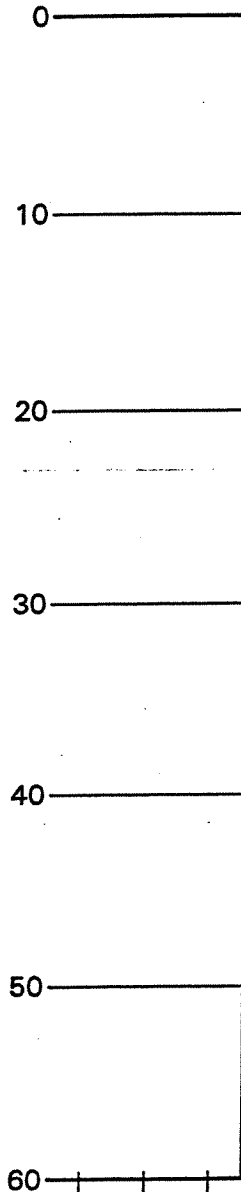
# BORING 4

ELEVATION: 119.8 ± FEET

DRILLED: 8/19/97

DATE: 8/23/97  
 DATE: 11/10/97  
 CHECKED BY: [Signature]  
 TOTAL SPT: 5  
 PLATE NUMBER: 5

DEPTH IN FEET



SP	WHITE TO TAN SLIGHTLY SILTY FINE SAND WITH MEDIUM GRAVEL-LOOSE, DRY MOIST  YELLOW-BROWN TO BROWN
SM	BLACK SLIGHTLY CLAYEY SILTY FINE SAND WITH SOME GRAVEL AND COBBLES-LOOSE, MOIST
CL	BLACK FINE SANDY CLAY/CLAYEY FINE SAND-MEDIUM DENSE, VERY MOIST
SC	
SW	BROWN FINE TO SLIGHTLY COARSE SAND WITH FINE TO MEDIUM GRAVEL-MEDIUM DENSE, VERY MOIST
GM	BROWN FINE TO COARSE SANDY SILTY FINE TO COARSE GRAVEL-DENSE, SATURATED GRADING WITH MORE SILT
GW	RED-BROWN AND GRAY SLIGHTLY SILTY FINE TO COARSE SANDY FINE TO COARSE GRAVEL-DENSE  GRADING WITH COBBLES AND MORE FINE SAND GRADING WITH LESS SAND, MORE CLAY
CL	YELLOW-BROWN FINE TO COARSE SANDY SILTY CLAY-STIFF, VERY MOIST  GRADING WITH SOME GRAVEL
GM	YELLOW-BROWN FINE TO SLIGHTLY COARSE SANDY CLAYEY GRAVEL WITH COBBLES-DENSE

## NOTES:

1. THE BORING LOG DEPICTS SUBSURFACE CONDITIONS ONLY AT THE BORING LOCATION AND TIME DESIGNATED.
2. NOMENCLATURE USED TO DESCRIBE SOILS DEFINED ON PLATE 14.
3. SEE PLATE 2 FOR ADDITIONAL NOTES.

LOG OF BORING

DRILLED: 8/20/97

1. THE BORING LOG DEPICTS SUBSURFACE CONDITIONS ONLY AT THE BORING LOCATION AND TIME DESIGNATED.
2. NOMENCLATURE USED TO DESCRIBE SOILS DEFINED ON PLATE 14.
3. SEE PLATE 2 FOR ADDITIONAL NOTES.



**Raney Geotechnical**

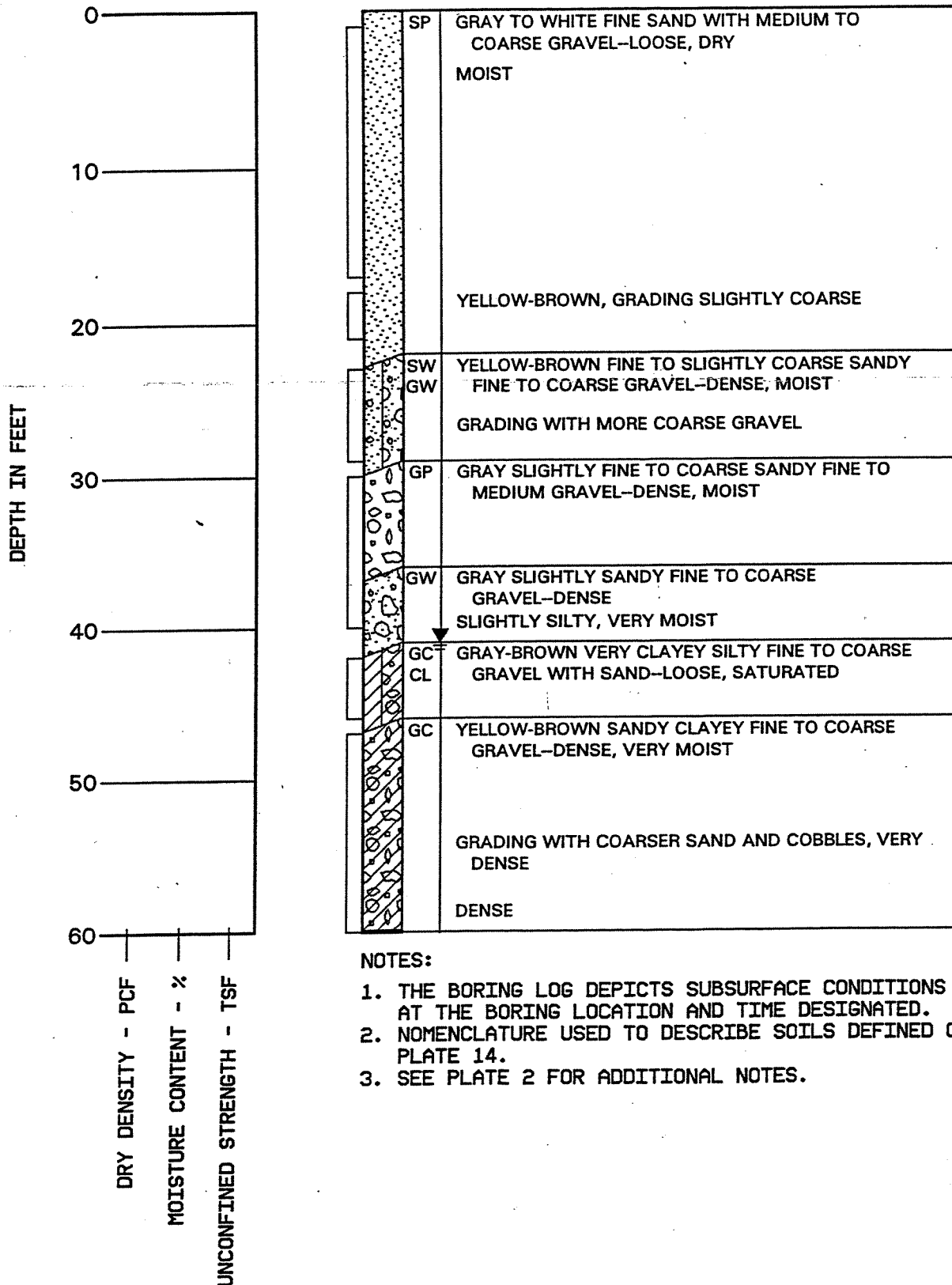
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TOTAL WEIGHT		WEIGHT		DATE:	1/1/90



# BORING 6

ELEVATION: 120.4 ± FEET

DRILLED: 8/19/97



## NOTES:

1. THE BORING LOG DEPICTS SUBSURFACE CONDITIONS ONLY AT THE BORING LOCATION AND TIME DESIGNATED.
2. NOMENCLATURE USED TO DESCRIBE SOILS DEFINED ON PLATE 14.
3. SEE PLATE 2 FOR ADDITIONAL NOTES.

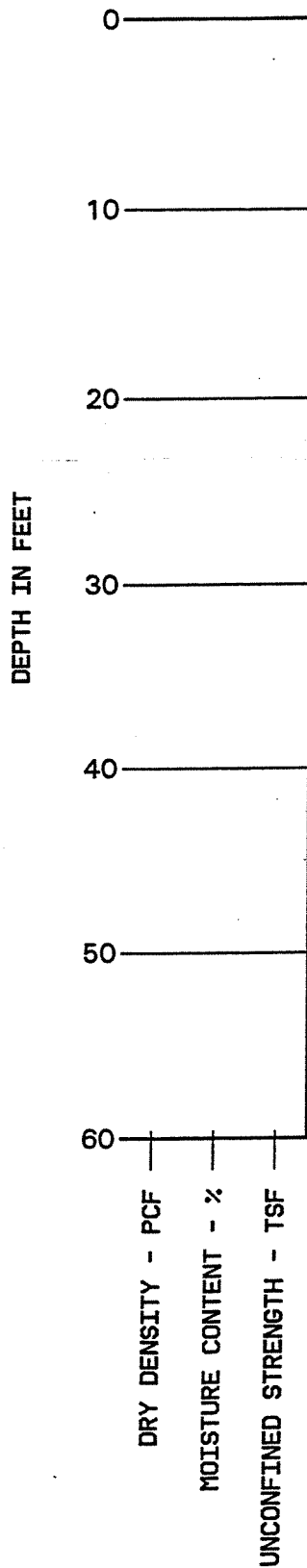
LOG OF BORING

# BORING 7

ELEVATION: 116.2 ± FEET

DRILLED: 8/19/97

PLATE NUMBER: 8  
 CHECKED BY: *Raney* DATE: 11/98



SP	WHITE TO TAN SLIGHTLY SILTY FINE SAND WITH COARSE GRAVEL-LOOSE, DRY MOIST
	GRADING WITH LESS TO NO GRAVEL
	YELLOW-BROWN
	BROWN, GRADING WITH GRAVEL
GP	GRAY SLIGHTLY FINE TO COARSE SANDY FINE TO MEDIUM GRAVEL-DENSE, SATURATED
	BROWN, GRADING WITH SILT AND MORE FINE SAND GRAY
CL	YELLOW-BROWN SLIGHTLY FINE GRAVELLY FINE TO COARSE SANDY SILTY CLAY/CLAYEY SAND-DENSE
SC	
CL	YELLOW-BROWN FINE SANDY CLAY WITH COBBLES-VERY STIFF, VERY MOIST
SP	YELLOW-BROWN SILTY FINE SAND WITH COARSE GRAVEL AND COBBLES-MEDIUM DENSE, SATURATED
SW	GRAY FINE TO COARSE SAND WITH FINE TO MEDIUM GRAVEL-DENSE
	YELLOW-BROWN, GRADING WITH CLAY
GM	YELLOW-BROWN SLIGHTLY FINE TO COARSE SANDY SILTY FINE TO COARSE GRAVEL-VERY DENSE

## NOTES:

1. THE BORING LOG DEPICTS SUBSURFACE CONDITIONS ONLY AT THE BORING LOCATION AND TIME DESIGNATED.
2. NOMENCLATURE USED TO DESCRIBE SOILS DEFINED ON PLATE 14.
3. SEE PLATE 2 FOR ADDITIONAL NOTES.

LOG OF BORING

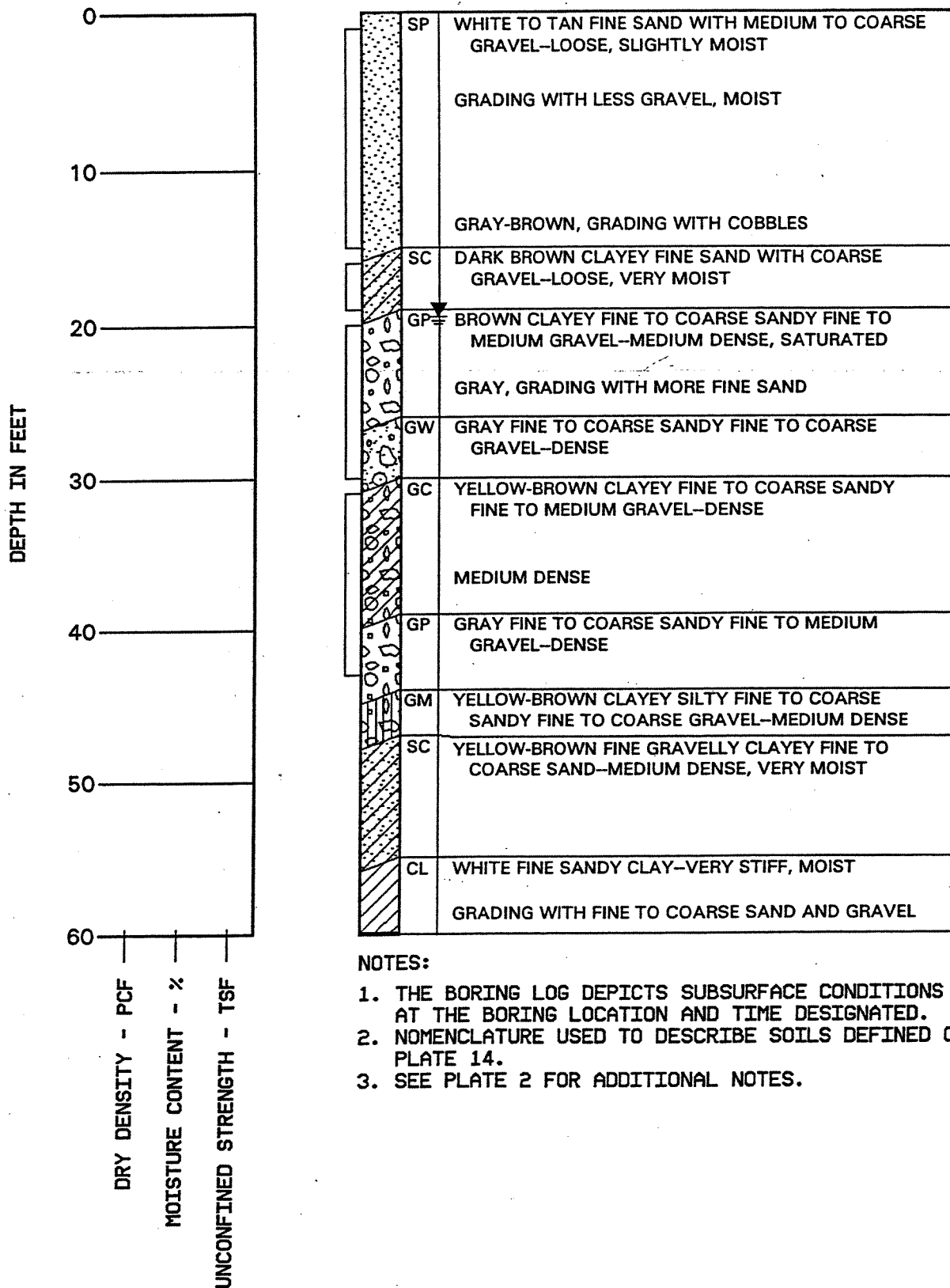


PLATE NUMBER: 9  
 CHECKED BY: *Curry* DATE: 1/9/98

## BORING 8

ELEVATION: 111.8 ± FEET

DRILLED: 8/20/97



### NOTES:

1. THE BORING LOG DEPICTS SUBSURFACE CONDITIONS ONLY AT THE BORING LOCATION AND TIME DESIGNATED.
2. NOMENCLATURE USED TO DESCRIBE SOILS DEFINED ON PLATE 14.
3. SEE PLATE 2 FOR ADDITIONAL NOTES.

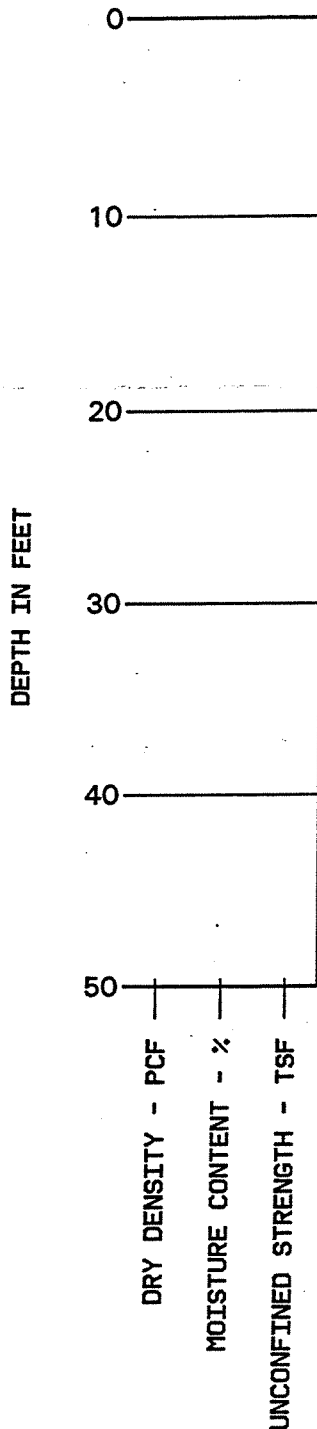
LOG OF BORING

DATE: 1/19/98  
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 DATE: 10  
 PLATE NUMBER: 10

# BORING 9

ELEVATION: 117.8 ± FEET

DRILLED: 8/20/97



SP	WHITE TO TAN FINE SAND WITH FINE TO MEDIUM GRAVEL-LOOSE, SLIGHTLY MOIST
	MOIST
	DARK BROWN, GRADING WITH CLAY
ML	DARK BROWN FINE SANDY SILT-VERY STIFF, SLIGHTLY MOIST
GW	GRAY SLIGHTLY SILTY FINE TO COARSE SANDY FINE TO MEDIUM GRAVEL-DENSE
	DARK BROWN, GRADING WITH CLAY
	GRADING WITH COBBLES, MOIST
GC	YELLOW-BROWN SLIGHTLY SANDY VERY CLAYEY FINE TO COARSE GRAVEL-DENSE, VERY MOIST
CL	RED-BROWN FINE TO COARSE SANDY GRAVELLY CLAY WITH COBBLES-STIFF TO VERY STIFF

## NOTES:

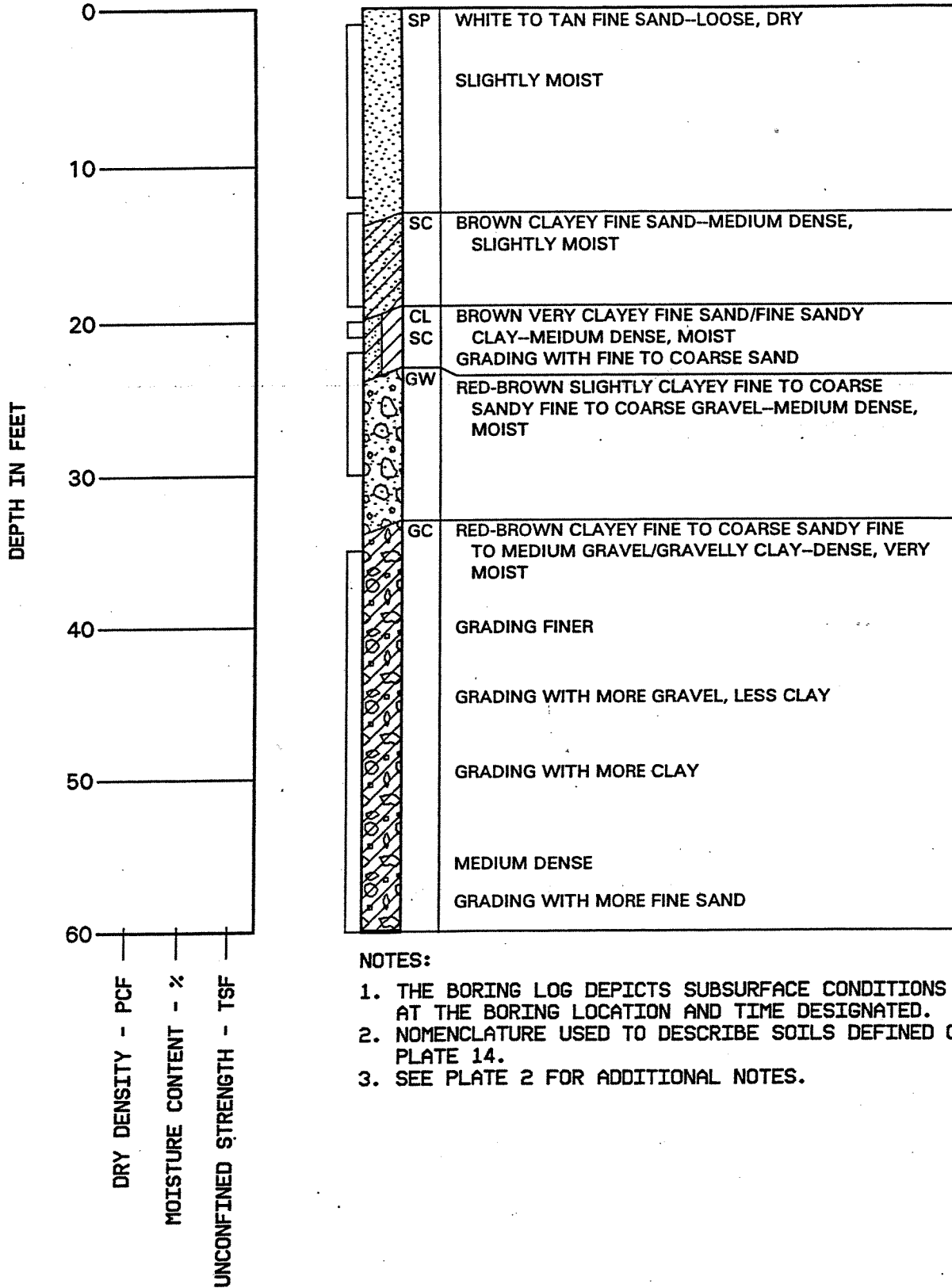
1. THE BORING LOG DEPICTS SUBSURFACE CONDITIONS ONLY AT THE BORING LOCATION AND TIME DESIGNATED.
2. NOMENCLATURE USED TO DESCRIBE SOILS DEFINED ON PLATE 14.
3. SEE PLATE 2 FOR ADDITIONAL NOTES.

LOG OF BORING

# BORING 10

ELEVATION: 115.4 ± FEET

DRILLED: 8/21/97



## NOTES:

1. THE BORING LOG DEPICTS SUBSURFACE CONDITIONS ONLY AT THE BORING LOCATION AND TIME DESIGNATED.
2. NOMENCLATURE USED TO DESCRIBE SOILS DEFINED ON PLATE 14.
3. SEE PLATE 2 FOR ADDITIONAL NOTES.

LOG OF BORING



DATE: 11/19/93

CHECKED BY: [Signature]

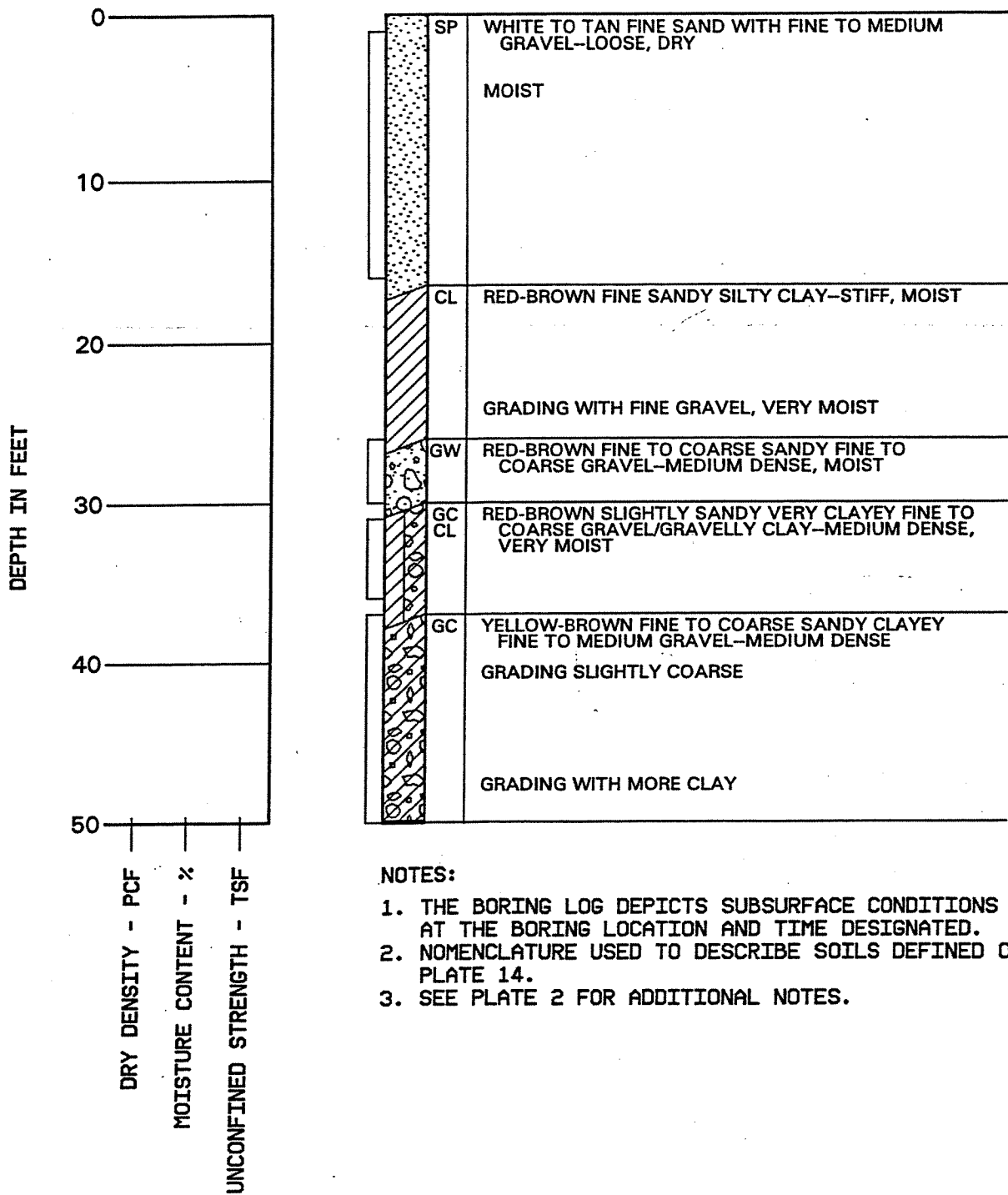
PLATE NUMBER: 11

PLATE NUMBER: 12  
CHECKED BY: *Ranney* DATE: 1/19/98

# BORING 11

ELEVATION: 114.1 ± FEET

DRILLED: 8/21/97



## NOTES:

1. THE BORING LOG DEPICTS SUBSURFACE CONDITIONS ONLY AT THE BORING LOCATION AND TIME DESIGNATED.
2. NOMENCLATURE USED TO DESCRIBE SOILS DEFINED ON PLATE 14.
3. SEE PLATE 2 FOR ADDITIONAL NOTES.

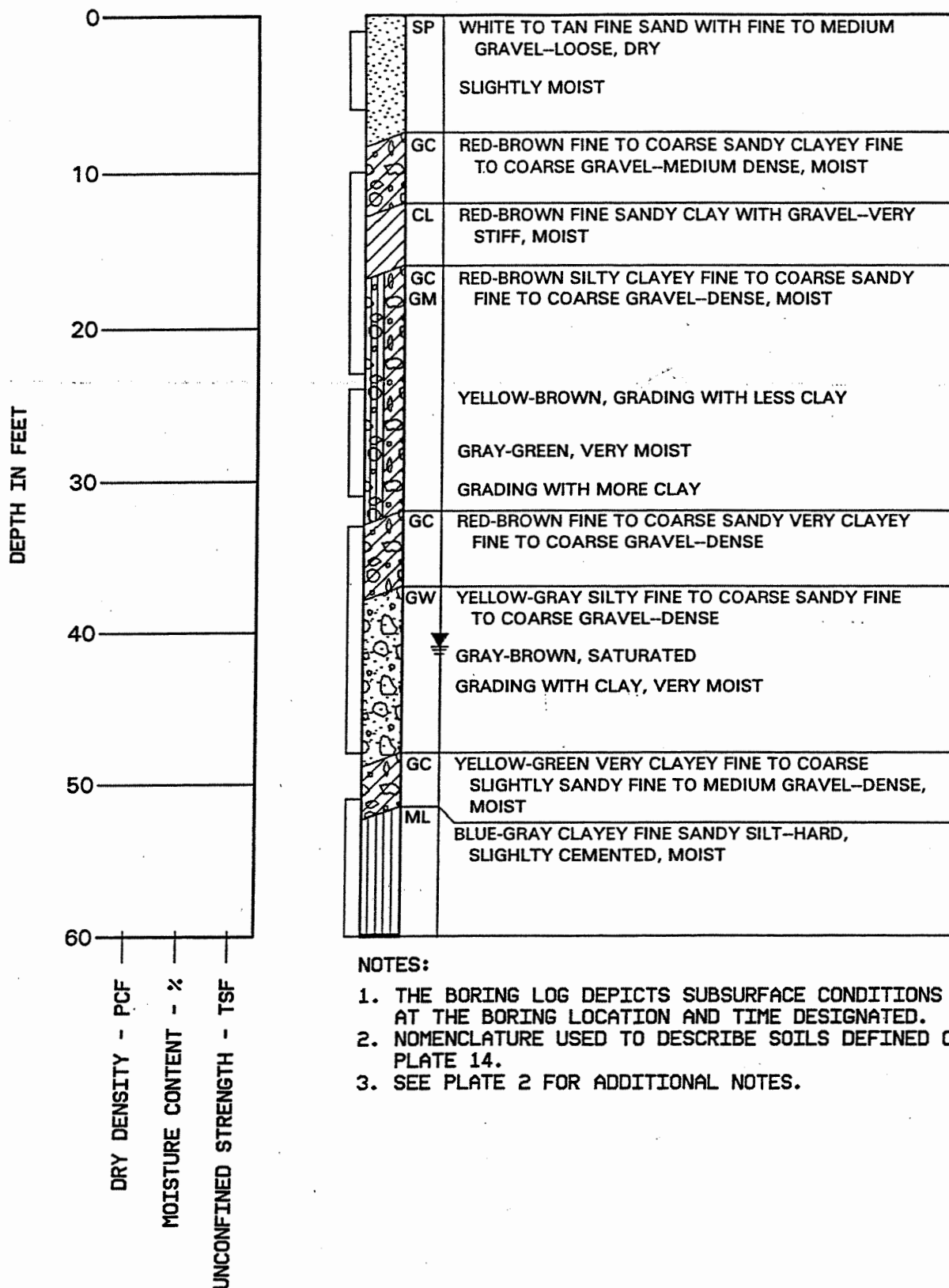
## LOG OF BORING

PLATE NUMBER: 13  
CHECKED BY: Donna DATE: 11/19/03

## BORING 12

ELEVATION: ± FEET

DRILLED: 8/21/97



### NOTES:

1. THE BORING LOG DEPICTS SUBSURFACE CONDITIONS ONLY AT THE BORING LOCATION AND TIME DESIGNATED.
2. NOMENCLATURE USED TO DESCRIBE SOILS DEFINED ON PLATE 14.
3. SEE PLATE 2 FOR ADDITIONAL NOTES.

LOG OF BORING



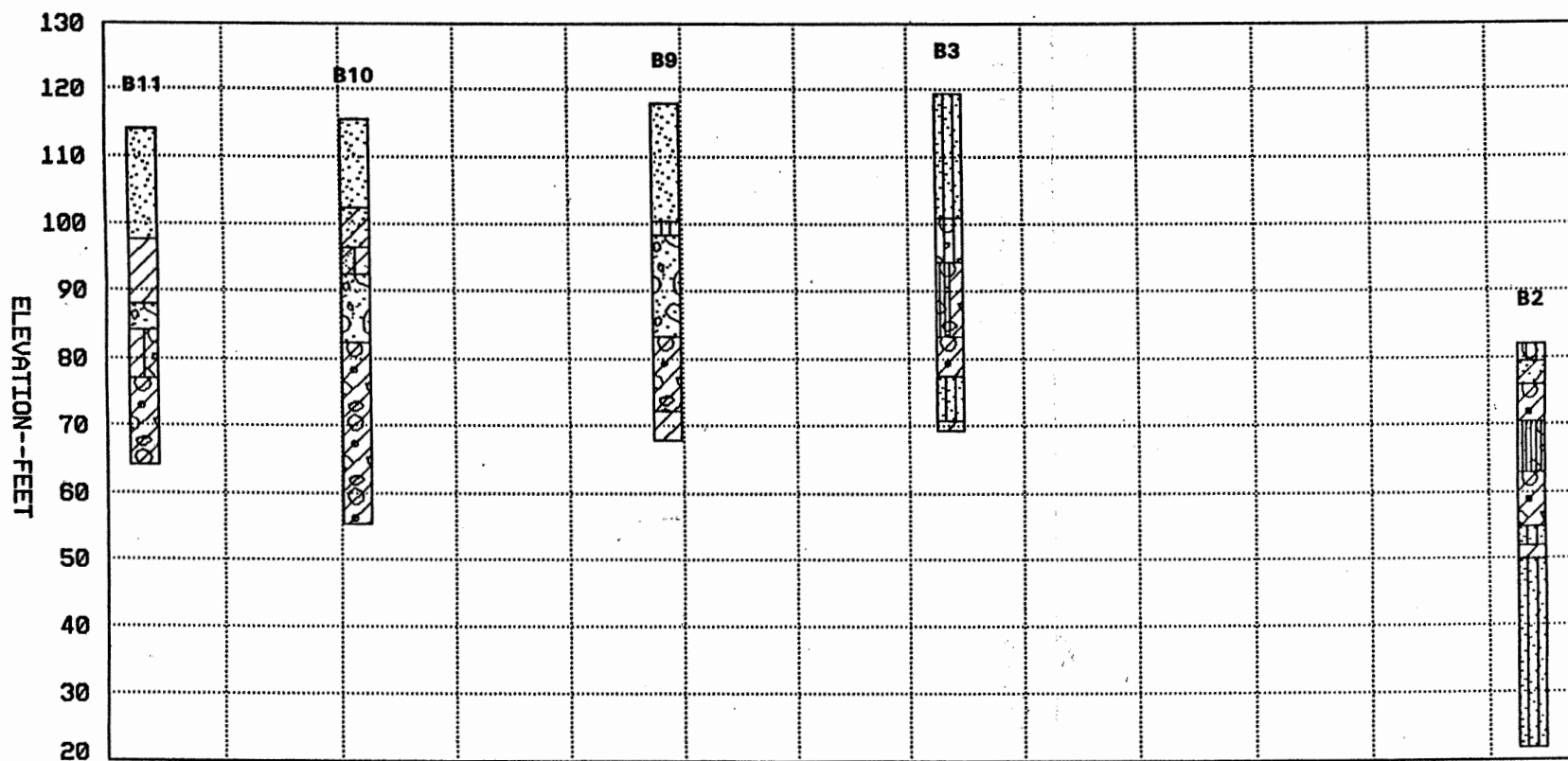
GRAPH	SYMBOL	DESCRIPTION	MAJOR DIVISIONS			
	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES	CLEAN GRAVELS WITH LESS THAN 5% FINES	GRAVEL AND GRAVELLY SOILS	COARSE GRAINED SOILS MORE THAN 50% LARGER THAN NO. 200 SIEVE	
	GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES				
	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES	GRAVELS WITH MORE THAN 12% FINES	MORE THAN 50% OF COARSE FRACTION <u>RETAINED</u> ON NO. 4 SIEVE		
	GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES				
	SW	WELL GRADED SANDS, GRAVELLY SANDS	CLEAN SANDS WITH LESS THAN 5% FINES	SANDS AND SANDY SOILS		
	SP	POORLY GRADED SANDS, GRAVELLY SANDS				
	SM	SILTY SANDS, SAND-SILT MIXTURES	SANDS WITH MORE THAN 12% FINES	MORE THAN 50% OF COARSE FRACTION <u>PASSING</u> NO. 4 SIEVE		
	SC	CLAYEY SANDS, SAND-CLAY MIXTURES				
	ML	INORGANIC SILTS, ROCK FLOUR, OR CLAYEY SILTS WITH SLIGHT PLASTICITY	LIQUID LIMIT <u>LESS</u> THAN 50	SILTS AND CLAYS	FINE GRAINED SOILS MORE THAN 50% SMALLER THAN NO. 200 SIEVE	
		CL				INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
		OL				ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTS, ELASTIC SILTS	LIQUID LIMIT <u>GREATER</u> THAN 50	SILTS AND CLAYS		
		CH				INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
		OH				ORGANIC CLAYS AND ORGANIC SILTS OF MEDIUM TO HIGH PLASTICITY
	PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENT	HIGHLY ORGANIC SOILS			



PROJECT NUMBER: STATE 004  
PLATE NUMBER: 15

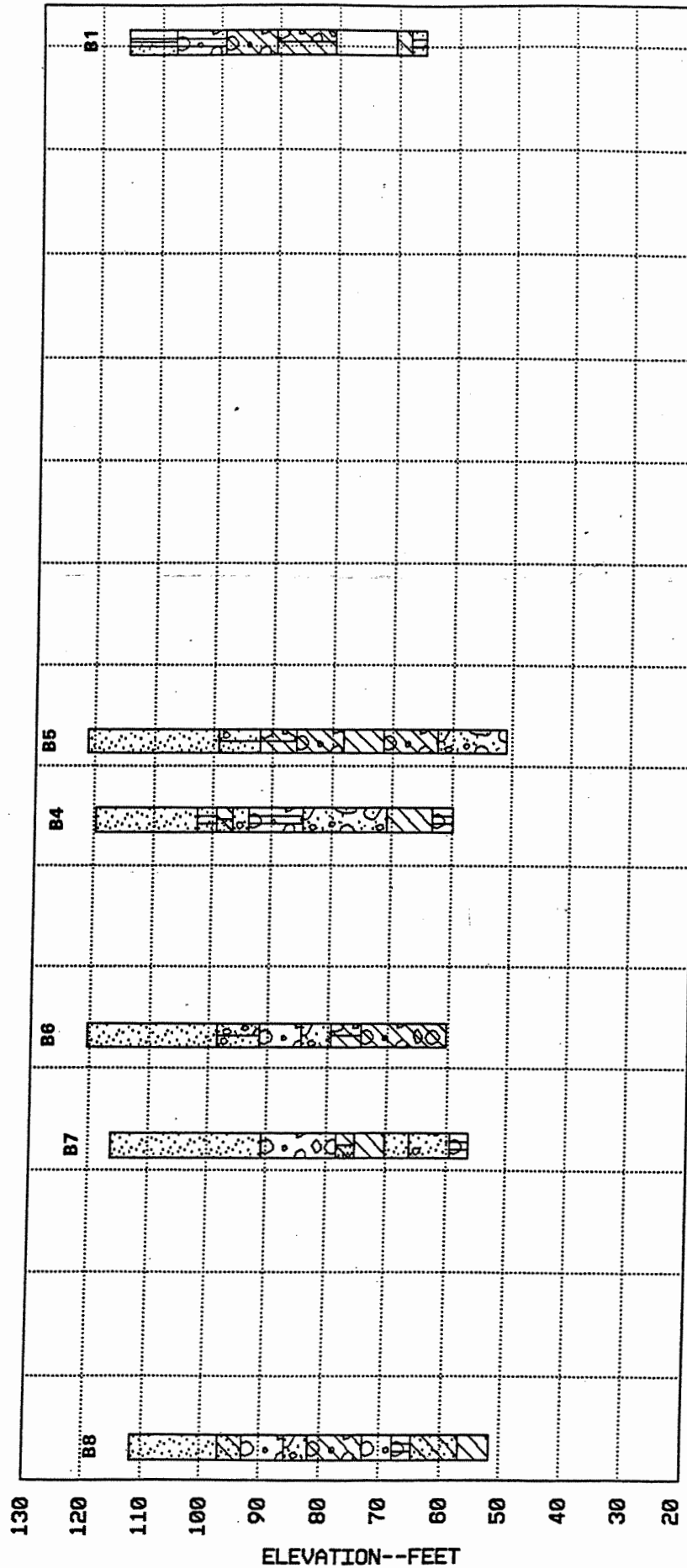
DRAWN BY: DGN DATE: 12/11/70  
CHECKED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

GENERALIZED SOIL PROFILE, SECTION A-A



NOTES:

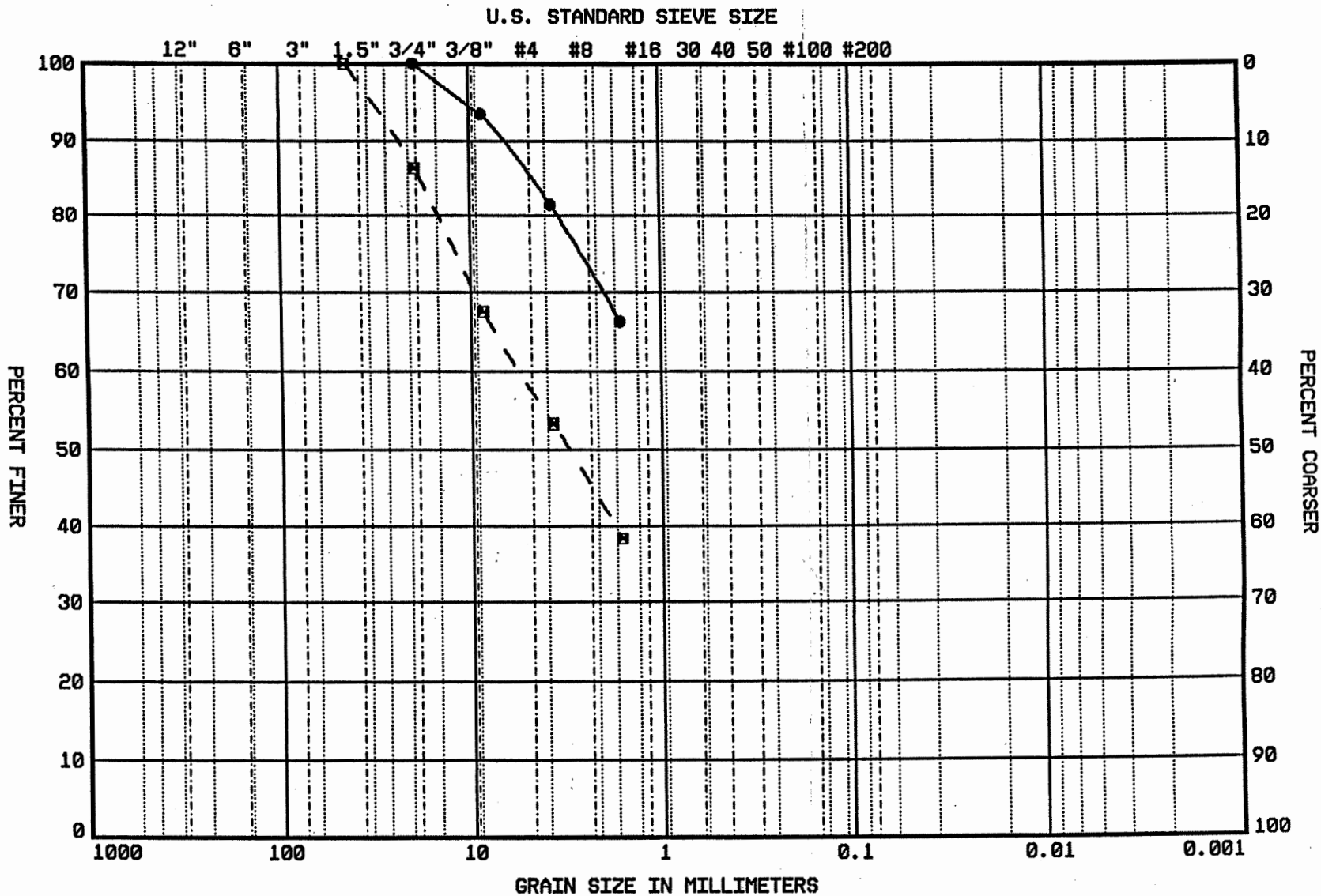
1. HORIZONTAL SCALE -- 1" = 800'
2. SEE PLATE 14 FOR DEFINITION OF SYMBOLS.



GENERALIZED SOIL PROFILE, SECTION B-B

- NOTES:
1. HORIZONTAL SCALE -- 1" = 800'
  2. SEE PLATE 14 FOR DEFINITION OF SYMBOLS.

SYMBOL	LOCATION	DEPTH	UNIFIED CLASSIFICATION	DESCRIPTION
●	B1	25.0'		YELLOW-BROWN CLAYEY FINE TO COARSE GRAVEL
⊠	B11	37.0'		YELLOW-BROWN CLAYEY FINE TO MEDIUM GRAVEL



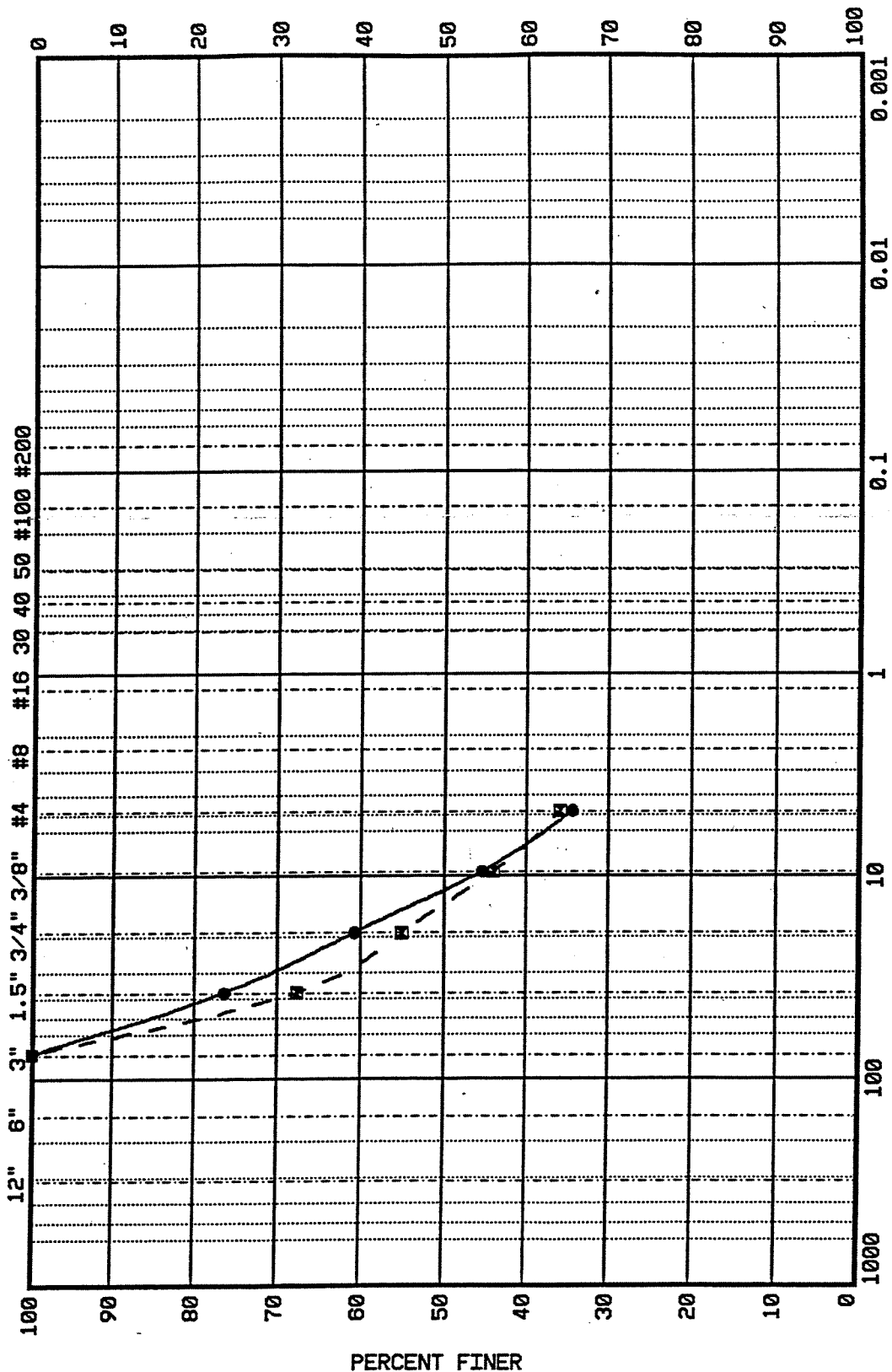
BOULDERS	COBBLES	GRAVEL		SAND			SILT	CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE		

GRAIN SIZE DISTRIBUTION

PLATE NUMBER: 18

SYMBOL	LOCATION	DEPTH	UNIFIED CLASSIFICATION	DESCRIPTION
●	B2	13.0'		GRAY SILTY FINE TO COARSE SANDY GRAVEL
⊠	B3	19.0'		GRAY-BROWN SANDY SILTY FINE TO COARSE GRAVEL

U.S. STANDARD SIEVE SIZE



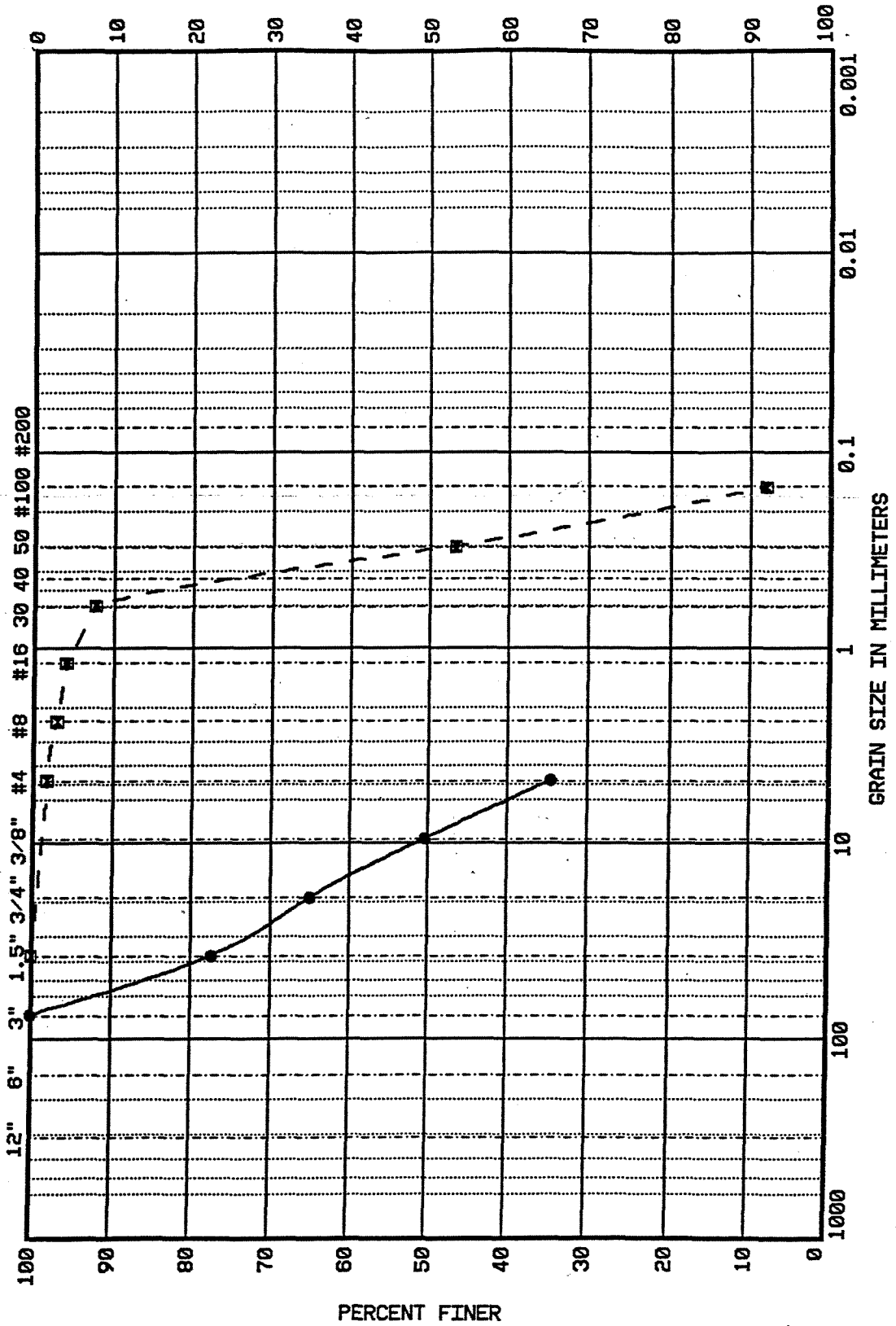
## GRAIN SIZE DISTRIBUTION



BOULDERS	COBBLES	GRAVEL		SAND			SILT	CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE		

SYMBOL	LOCATION	DEPTH	UNIFIED CLASSIFICATION	DESCRIPTION
●	B4	35.0'		GRAY SILTY SANDY FINE TO COARSE GRAVEL
⊠	B5	1.0'		WHITE SLIGHTLY SILTY FINE SAND WITH GRAVEL

U.S. STANDARD SIEVE SIZE

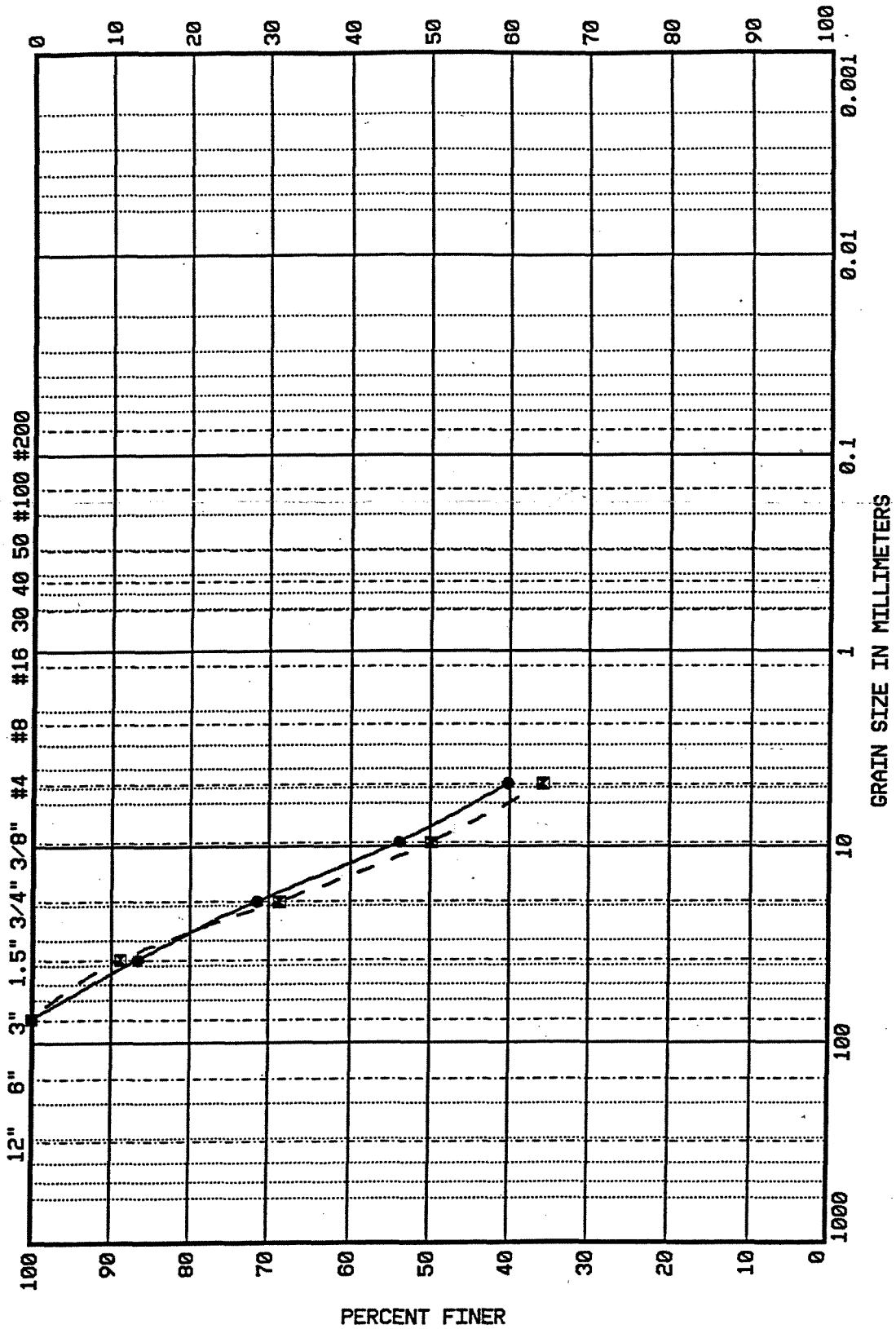


# GRAIN SIZE DISTRIBUTION



SYMBOL	LOCATION	DEPTH	UNIFIED CLASSIFICATION	DESCRIPTION
●	B5	29.0'		GRAY-BROWN SANDY CLAYEY FINE TO COARSE GRAVEL
■	B5	66.0'		GRAY-BROWN SANDY CLAYEY FINE TO COARSE GRAVEL

U.S. STANDARD SIEVE SIZE



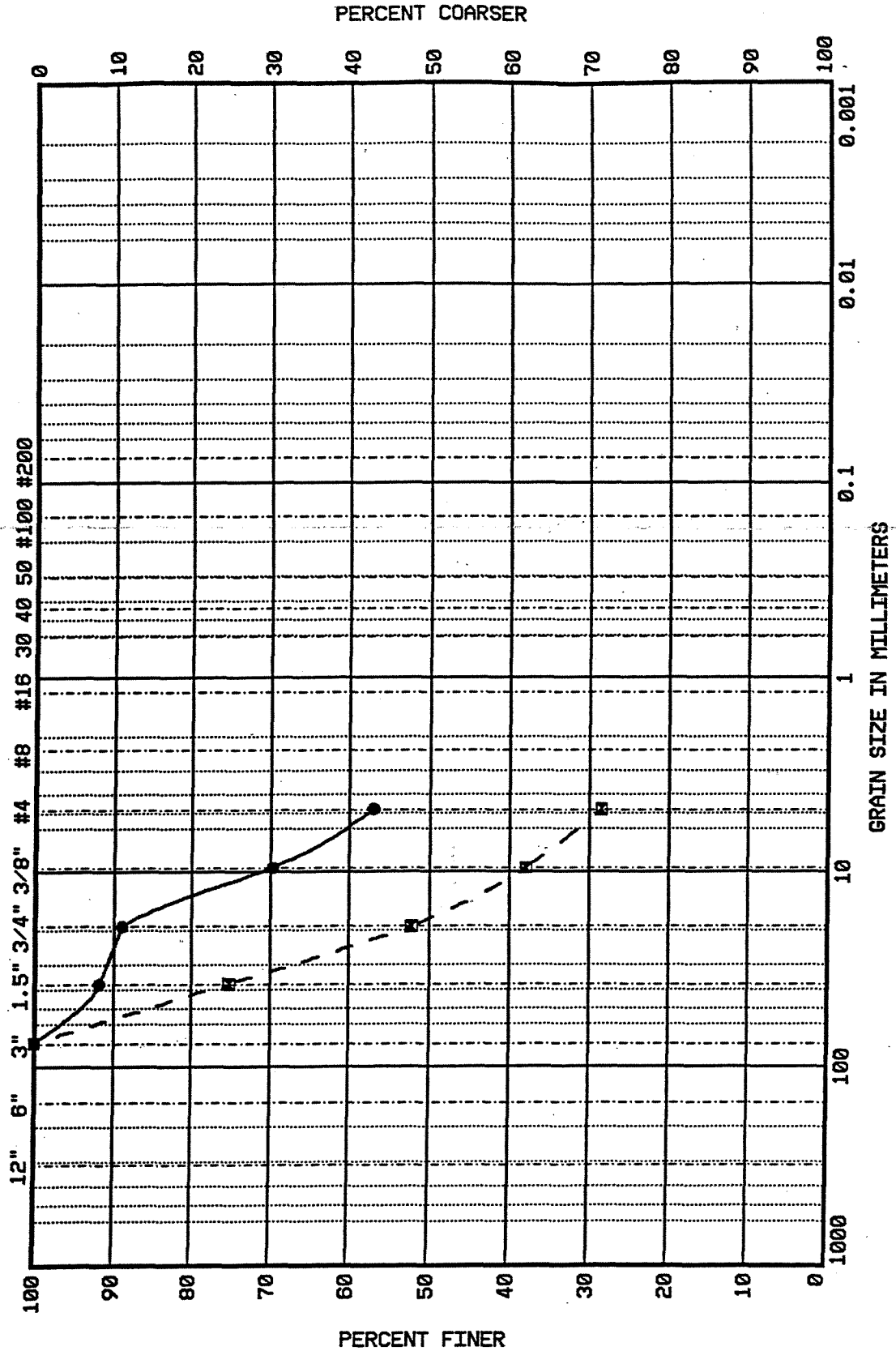
GRAIN SIZE DISTRIBUTION



BOULDERS	COBBLES	GRAVEL		SAND			SILT	CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE		

SYMBOL	LOCATION	DEPTH	UNIFIED CLASSIFICATION	DESCRIPTION
●	B7	46.0'		YELLOW-BROWN SILTY FINE SAND WITH GRAVEL
■	B8	20.0'		BROWN SANDY CLAYEY FINE TO MEDIUM GRAVEL

U.S. STANDARD SIEVE SIZE



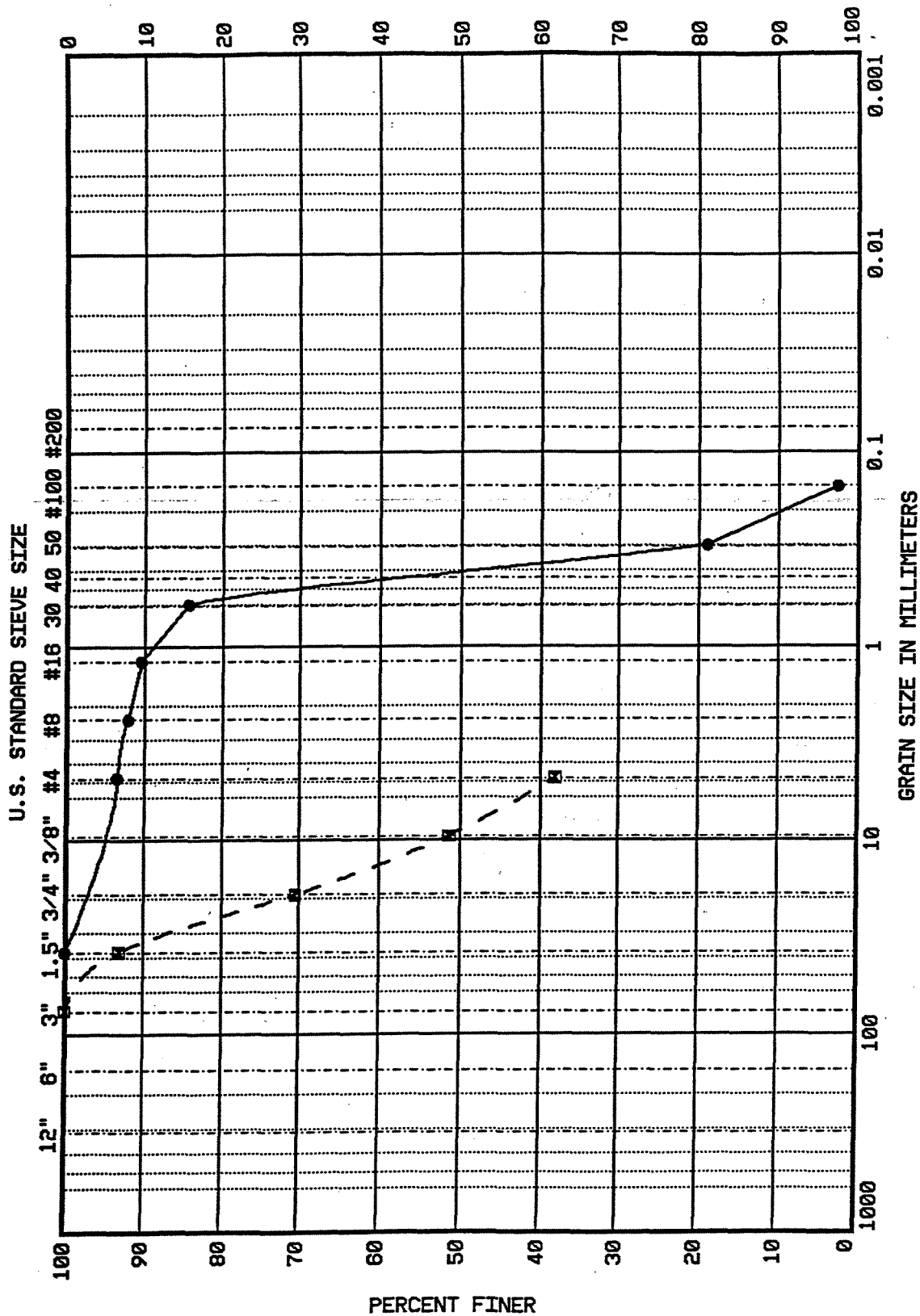
BOULDERS	COBBLES	GRAVEL			SAND			SILT	CLAY
		COARSE	FINE		COARSE	MEDIUM	FINE		

# GRAIN SIZE DISTRIBUTION





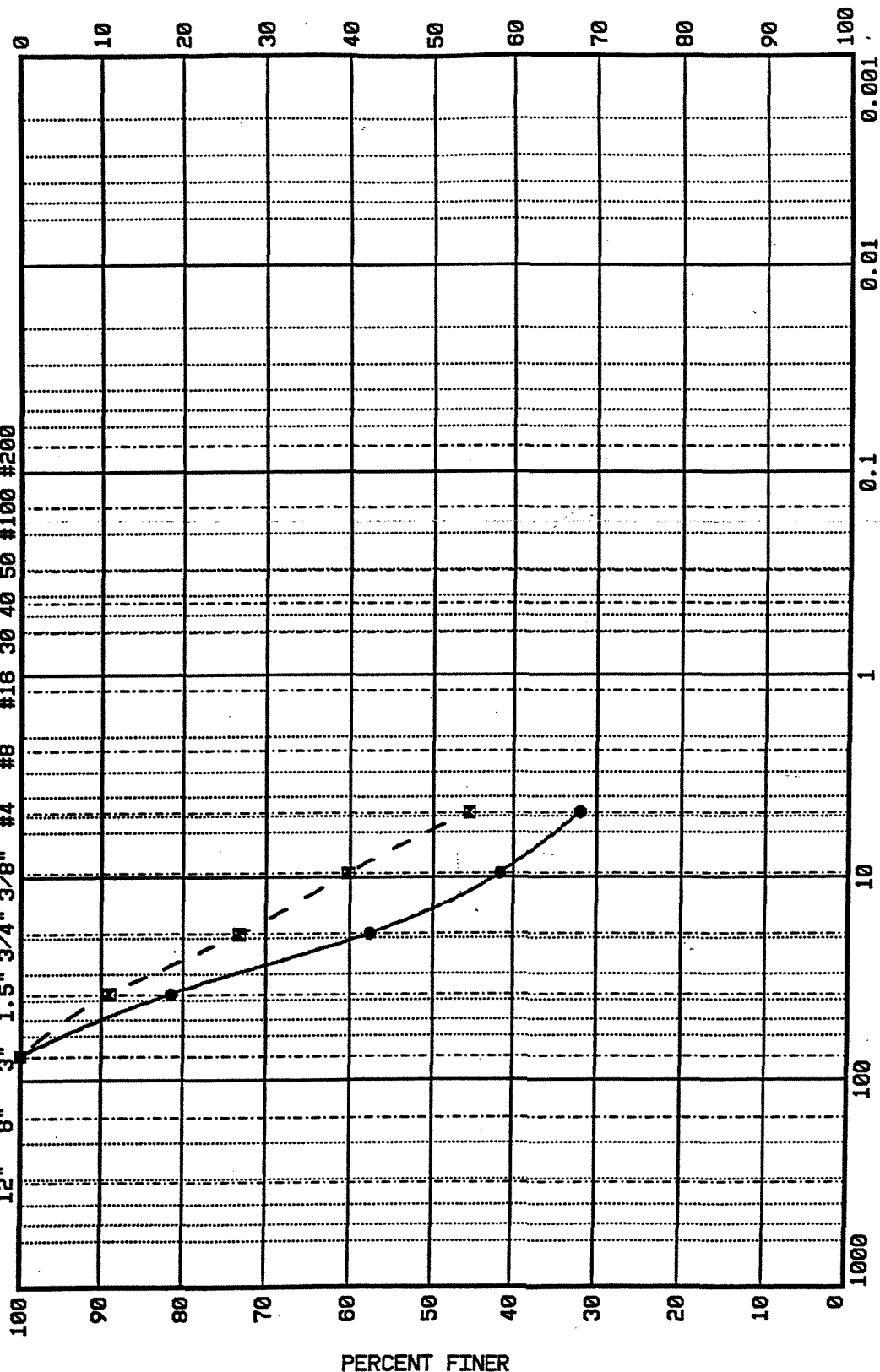
SYMBOL	LOCATION	DEPTH	UNIFIED CLASSIFICATION	DESCRIPTION
●	B9	1.0'		WHITE FINE SAND WITH MEDIUM GRAVEL
⊠	B9	19.0'		GRAY SANDY SILTY FINE TO MEDIUM GRAVEL



SYMBOL	LOCATION	DEPTH	UNIFIED CLASSIFICATION	DESCRIPTION
●	B12	16.0'		RED-BROWN SILTY CLAYEY FINE TO COARSE GRAVEL
⊠	B12	33.0'		RED-BROWN SANDY CLAYEY FINE TO COARSE GRAVEL

U.S. STANDARD SIEVE SIZE

12" 8" 3" 1.5" 3/4" 3/8" #4 #8 #16 30 40 50 #100 #200



# GRAIN SIZE DISTRIBUTION



BOULDERS	COBBLES	GRAVEL		SAND			SILT	CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE		

# **RESISTANCE TO DEGRADATION** **ASTM C131 STANDARD METHOD**

Sample I.D.	B3 25'-35'		B10 35'-60'	
Material Description	Yellow-brown clayey silty fine to coarse gravel		Red-brown sandy clayey fine to medium gravel	
Number of Revolutions	100	500	100	500
Percent Wear	3.3	21.7	5.0	21.0

**LA RATTLER DATA**